Progress Monitoring Assessments
# Table of Contents

To the Teacher ................................................................. v

**Screening Test** ............................................................. 1

  Screening Test Report .................................................... 7

**Standards Progress Tests**

  Standards Progress Test 1, Chapters 1 and 2 ....................... 9

  Standards Progress Test 1 Report ................................... 15

  Standards Progress Test 2, Chapters 3 and 4 ..................... 17

  Standards Progress Test 2 Report ................................... 23

  Standards Progress Test 3, Chapters 5 and 6 ..................... 25

  Standards Progress Test 3 Report ................................... 31

  Standards Progress Test 4, Chapters 7 and 8 ..................... 33

  Standards Progress Test 4 Report ................................... 39

  Standards Progress Test 5, Chapters 9–12 ........................ 41

  Standards Progress Test 5 Report ................................... 49

**Summative Assessments, Form G**

  Quarter 1 Test, Chapters 1–3 ......................................... 51

  Quarter 2 Test, Chapters 4–6 ......................................... 53

  Quarter 3 Test, Chapters 7–9 ......................................... 55

  Quarter 4 Test, Chapters 10–12 ..................................... 57

  Mid-Course Test, Chapters 1–6 ..................................... 59

  Final Test, Chapters 1–12 ............................................. 63
Summative Assessments, Form K
Quarter 1 Test, Chapters 1–3 ................................. 67
Quarter 2 Test, Chapters 4–6 ................................. 69
Quarter 3 Test, Chapters 7–9 ................................. 71
Quarter 4 Test, Chapters 10–12 ............................ 73
Mid-Course Test, Chapters 1–6 ............................. 75
Final Test, Chapters 1–12 ...................................... 79

End of Course Algebra 1 Practice Test ..................... 83
Correlation Chart: End of Course Algebra 1 Practice Test
to the Tennessee State Performance Indicators .............. 95

SAT/ACT Preparation
Introduction ..................................................... 99
Highlights ...................................................... 100
Test-Taking Tips ................................................ 108
Practice Test .................................................... 115
Answers .......................................................... 127
Student Answer Sheets ....................................... 135
To the Teacher:
During the school year, you assess how well students in your classroom are learning using various types of assessments. Prentice Hall’s *Progress Monitoring Assessments* provides a clear path to adequate yearly progress through systematic testing and recommendations for remediation.

Formative Assessments
Formative Assessments help you monitor students’ understandings of key concepts and the development of important skills. The results of these assessments serve as a guide to help in the planning and adjusting of the curriculum to meet your students’ learning needs. Formative Assessments in this book are listed below.

**Screening Test**
Before launching into the curriculum, have students complete the Screening Test. It will help you assess students’ levels of proficiency in basic computation and problem-solving skills.

**Standards Progress Tests**
Proficiency testing is at the heart of student achievement. At specified intervals throughout the school year, have students take one of the Tennessee Standards Progress Tests to assess their progress towards proficiency of the essential content of the State Performance Indicators for Algebra 1.

Summative Assessments
Summative Assessments help you determine how proficient students are in the concepts and skills that were the recent focus of instruction. These assessments are generally administered at the end of a quarter, semester, or school year. Summative Assessments in this book are listed below.

**Quarter and Mid-Course Tests**
These tests are designed to measure students’ mastery of content over a number of chapters. Two levels of Quarter and Mid-Course Tests are provided. The G-level tests are appropriate for students enrolled in on-grade level or advanced-level courses and the K-level tests are designed for students using the Foundations series or for students who might benefit from a lower academic reading level.

**Final Test**
The Final Test is a cumulative test that measures students’ mastery of content over the full school year.
Standardized or State Assessments
Your students are likely used to taking standardized or state-mandated assessments. Students take the SAT or ACT as part of the college application process. State-mandated assessments are a high school graduation requirement in many states. This book provides students with practice for these two types of tests.

SAT® and ACT® Practice Test
You can use these pages to acquaint students with topics, question formats, and practice for the SAT or the ACT. The activities and practice provided on these pages will help students be less anxious when they take these high-stakes assessments.

End of Course Practice Test
An End of Course Practice Test is also available. This practice test matches the content and format of the End of Course Algebra 1 Test and offers your students practice with both the mathematical concepts tested on the End of Course Algebra 1 Test and question types found on the test. Also provided is a test report that your students can use to self-evaluate their readiness for the actual test. Students can give themselves one (1) point for multiple-choice questions that they answer correctly. At the bottom of the page, students can find their total points.
Choose the best answer for the problems.

1. Which is the place value of the underlined digit?
   7,324,618,2123
   A millions  
   B hundred thousands  
   C ten millions  
   D ten thousands

2. Which is the value of the underlined digit?
   728,426  
   F 80,000  
   G 8,000  
   H 800  
   J 80

3. Which number does the model show?

4. Which number is modeled below?

5. Which fraction is represented by the shaded part shown below?

6. Last year four business executives earned the frequent flier miles shown in the table below. Which executive earned the most miles?

<table>
<thead>
<tr>
<th>Frequent Flier Miles</th>
<th>Executive</th>
<th>Miles Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reynolds</td>
<td>201,315</td>
</tr>
<tr>
<td></td>
<td>Freeman</td>
<td>211,614</td>
</tr>
<tr>
<td></td>
<td>Luis</td>
<td>212,315</td>
</tr>
<tr>
<td></td>
<td>Sanchez</td>
<td>201,217</td>
</tr>
</tbody>
</table>

Prentice Hall Algebra 1 • Progress Monitoring Assessments
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7. Which statement is false?
   A  $0.7 < \frac{4}{5}$
   B  $\frac{2}{3} > 0.34$
   C  $2.16 > 2\frac{1}{4}$
   D  $\frac{5}{6} < \frac{7}{8}$

8. Add. $67,654 + 98,786$
   F  166,440
   G  175,330
   H  176,540
   J  186,330

9. Subtract. $8,092 - 1,063$
   A  7,041
   B  7,031
   C  7,029
   D  6,029

10. Add. $\frac{4}{21} + \frac{8}{21}$
    F  $\frac{11}{21}$
    G  $\frac{15}{21}$
    H  $\frac{4}{7}$
    J  $\frac{4}{21}$

11. Subtract. $\frac{32}{52} - \frac{18}{52}$
    A  $\frac{7}{26}$
    B  $\frac{15}{26}$
    C  $\frac{11}{26}$
    D  $\frac{25}{26}$

12. Add. $17.347 + 28.821$
    F  45.168
    G  45.168
    H  45.168
    J  47.168

13. Multiply. $2,344 \times 505$
    A  1,173,1720
    B  1,183,720
    C  1,173,270
    D  1,162,710

14. Divide. $8,887 \div 26$
    F  341
    G  341 R 21
    H  350
    J  351 R 7

15. A bottling company produces 7,200 cans of iced tea per day. How many 12-can cartons can be filled?
    A  6 cartons
    B  60 cartons
    C  600 cartons
    D  700 cartons
16. Which ratio could be used to solve the following problem? Ken drives his car 800 miles in 3 days. At this rate, how far will he drive in 5 days?

F \[ \frac{800}{5} = \frac{3}{x} \]
G \[ \frac{800}{3} = \frac{5}{x} \]
H \[ \frac{800}{8} = \frac{x}{5} \]
J \[ \frac{800}{3} = \frac{x}{5} \]

17. Which number is odd?
A 37,246
B 82,342
C 764,820
D 82,341,361

18. Which set of numbers list all of the factors of 121?
F 1, 121
G 1, 2, 60, 121
H 1, 11, 121
J 1, 3, 4, 40, 30, 121

19. Simplify. \(8(7 - 4)^2 + 3 \cdot 2 \cdot 5\)
A 78
B 102
C 510
D 750

20. Find the quotient. \(\frac{4}{5} + \frac{2}{25}\)
F \[ \frac{2}{125} \]
G \[ \frac{8}{125} \]
H 2
J 10

21. A 1 \(\frac{1}{4}\) mile stretch of split-rail fence is to be constructed along one side of a farm. If it takes one day to construct \(\frac{1}{2}\) mile of fencing, how many days will it take to complete the fencing on the farm?
A 1 day
B 2 days
C 2 \(\frac{1}{2}\) days
D 2 \(\frac{3}{4}\) days

22. Evaluate \(m + m^2 + 2b^3\) for \(m = 4\) and \(b = 0\).
F 12
G 14
H 20
J 22

23. You need to measure the height of your bean plants each week for a science project. Which unit of measurement would you use?
A centimeters
B meters
C kilometers
D grams

24. To measure the height of your bean plants (from question 23) which instrument should you use?
F compass
G stopwatch
H thermometer
J ruler
25. The formula for the perimeter of a rectangle is \( P = 2l + 2w \). Use the formula to determine how many feet of fencing would be needed to go around a rectangular vegetable garden measuring 30 feet by 25 feet.

A 55 feet  
B 85 feet  
C 110 feet  
D 750 feet

26. The formula for the area of a rectangle is \( A = lw \). A field has a length of 260 meters and a width of 500 meters. Part of the field 50 meters by 200 meters, is paved for a parking lot. How much of the area remains unpaved?

F 10,000 m\(^2\)  
G 80,000 m\(^2\)  
H 120,000 m\(^2\)  
J 130,000 m\(^2\)

27. Mr. Kingston is going to have new carpet installed in his living room. In order to help him estimate the cost of the carpet what does he need to determine?

A the perimeter of the living room  
B the area of the living room  
C the volume of the living room  
D the surface area of the room

28. What is the best geometric description of the figure shown?

F circle  
G cylinder  
H sphere  
J hemisphere

29. What is the approximate measure of the angle shown below?

A 10°  
B 30°  
C 75°  
D 110°

30. Which three-dimensional figure does not have a base?

F cylinder  
H cone  
G prism  
J sphere

31. Which solid figure would be constructed using the following shapes?

A triangular prism  
B triangular pyramid  
C rectangular prism  
D cube

32. Which figure(s) make up the faces and bases of the triangular prism?

F squares  
G rectangles  
H triangles and rectangles  
J circles and triangles
33. Marta asked some high school students which Florida cities they had visited on their vacations. The chart shows the results.

<table>
<thead>
<tr>
<th>Florida Vacations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>Number of Students</td>
</tr>
<tr>
<td>Orlando</td>
<td>72</td>
</tr>
<tr>
<td>Miami</td>
<td>60</td>
</tr>
<tr>
<td>Fort Myers</td>
<td>38</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>30</td>
</tr>
</tbody>
</table>

Which graph best represents the information in the chart?

A

B

C

D

34. The table shows the number of colors of crackers Tomaz found when he opened a bag of crackers into a bowl.

<table>
<thead>
<tr>
<th>Cracker Colors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Number</td>
</tr>
<tr>
<td>Red</td>
<td>5</td>
</tr>
<tr>
<td>Purple</td>
<td>8</td>
</tr>
<tr>
<td>Yellow</td>
<td>12</td>
</tr>
<tr>
<td>Orange</td>
<td>6</td>
</tr>
<tr>
<td>Green</td>
<td>4</td>
</tr>
</tbody>
</table>

If Tomaz closes his eyes, reaches into the bowl, and randomly selects a cracker, what is the probability that he picks a red cracker?

F \( \frac{1}{7} \)

G \( \frac{1}{3} \)

H 5%

J 35%

35. A spinner is spun and the results are shown in the table below.

<table>
<thead>
<tr>
<th>Color</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>⎁ ⎁ ⎁</td>
</tr>
<tr>
<td>Gold</td>
<td>⎌ ⎌</td>
</tr>
</tbody>
</table>

What is the probability of the spinner landing on purple?

A likely

B unlikely

C certain

D impossible

36. Michael is making sandwiches for lunch. He has the choice of turkey or ham, wheat or white bread, American or Swiss Cheese. How many different sandwiches can Michael make?

F 3 sandwiches

G 6 sandwiches

H 8 sandwiches

J 10 sandwiches
37. What is the probability of spinning a letter A on the spinner shown?

A \( \frac{1}{8} \)

B \( \frac{3}{8} \)

C \( \frac{1}{3} \)

D \( \frac{2}{3} \)

38. Which number will replace the question mark in the number pattern shown below?

0, 2, 2, 4, 6, 10, 16, 26, ?, . . .

F 28

G 36

39. What is the missing output value in the function table below?

<table>
<thead>
<tr>
<th>input</th>
<th>output</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

A 2

B 1

C 0

D –1

40. What are the coordinates of point D?

F (1, 5)

G (5, 4)

H (2, 2)

J (4, 5)

41. Evaluate \( 5(x + y) \) for \( x = 3 \) and \( y = 9 \).

A 17

B 24

C 60

D 72

42. Which is the algebraic sentence for “a number decreased by 6 is 12”?

F \( x + 6 = 12 \)

G \( x - 6 = 12 \)

H \( 6x = 12 \)

J \( \frac{x}{6} = 12 \)

43. Solve. \( y + 34 = -7 \)

A \( y = 41 \)

B \( y = 27 \)

C \( y = -27 \)

D \( y = -41 \)

44. Solve. \( 6x = 72 \)

F \( x = 432 \)

G \( x = 20 \)

H \( x = 12 \)

J \( x = 6 \)

45. Solve. \( \frac{m}{9} = 8 \)

A \( m = 1.1 \)

B \( m = 17 \)

C \( m = 27 \)

D \( m = 72 \)
## Screening Test Report

### Mathematics Concepts

<table>
<thead>
<tr>
<th>Number Properties and Operations</th>
<th>Test Item(s)</th>
<th>Proficient? Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the place value and actual value of digits in whole numbers.</td>
<td>1, 2</td>
<td></td>
</tr>
<tr>
<td>Connect model, number word, or number using various models and representations for whole numbers, fractions, and decimals.</td>
<td>3, 4, 5</td>
<td></td>
</tr>
<tr>
<td>Order or compare whole numbers, decimals, or fractions.</td>
<td>6, 7</td>
<td></td>
</tr>
<tr>
<td>Add and subtract: whole numbers.</td>
<td>8, 9</td>
<td></td>
</tr>
<tr>
<td>Add and subtract: fractions with like denominators.</td>
<td>10, 11</td>
<td></td>
</tr>
<tr>
<td>Multiply whole numbers: no larger than four-digit by three-digit.</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Divide whole numbers: up to four-digits by two-digits.</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Solve application problems involving whole numbers and operations.</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Use simple ratios to describe problem situations.</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Identify odd and even numbers.</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Identify factors of whole numbers.</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Apply basic properties of operations.</td>
<td>19, 20, 21, 22</td>
<td></td>
</tr>
</tbody>
</table>

### Measurement

| Identify the attribute that is appropriate to measure in a given situation.                         | 23           |                       |
| Select or use appropriate measurement instruments such as ruler, meter stick, clock, thermometer, or other scaled instruments. | 24           |                       |
| Solve problems involving perimeter of plane figures, providing the formula as part of the problem. | 25           |                       |
| Solve problems involving area of rectangles, providing the formula as part of the problem.        | 26           |                       |
| Select or use appropriate type of unit for the attribute being measured such as length, time, or temperature. | 27           |                       |

### Geometry

<p>| Describe (informally) real-world objects using simple plane figures (e.g., triangles, rectangles, squares, and circles) and simple solid figures (e.g., cubes, spheres, and cylinders). | 28           |                       |
| Identify or draw angles and other geometric figures in the plane.                                  | 29           |                       |
| Describe attributes of two- and three-dimensional shapes.                                          | 30           |                       |
| Assemble simple plane shapes to construct a given shape.                                          | 31           |                       |
| Recognize two-dimensional faces of three-dimensional shapes.                                      | 32           |                       |</p>
<table>
<thead>
<tr>
<th>Mathematics Concepts</th>
<th>Test Item(s)</th>
<th>Proficient? Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Analysis and Probability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pictograms, bar graphs, circle graphs, line graphs, line plots, tables, and tallies.</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Read or interpret a single set of data.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use informal probabilistic thinking to describe chance events (i.e., likely and unlikely, certain and impossible).</td>
<td>34, 35</td>
<td></td>
</tr>
<tr>
<td>List all possible outcomes of a given situation or event.</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Represent the probability of a given outcome from pictures of spinners and other devices.</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td><strong>Geometry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize, describe, or extend numerical patterns.</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Translate between the different forms of representations (symbolic, numerical, verbal, or pictorial) of whole-number relationships (such as from a written description to an equation or from a function table to a written description).</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Graph or interpret points with whole-number or letter coordinates on grids or in the first quadrant of the coordinate plane.</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Use letters and symbols to represent an unknown quantity in a simple mathematical expression.</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Express simple mathematical relationships using number sentences.</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Find the value of the unknown in a whole-number sentence.</td>
<td>43, 44, 45</td>
<td></td>
</tr>
</tbody>
</table>

**Student Comments:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Parent Comments:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Teacher Comments:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
1. Lucy is 4 years older than her sister Sophie. Which expression represents Sophie’s age in terms of Lucy’s age $l$?
   A $4l$
   B $4 - l$
   C $l - 4$
   D $l + 4$

2. The table below shows the number of boxes needed to ship certain numbers of books from a warehouse. Which equation models the relationship in the table if $b$ represents the number of boxes and $n$ represents the number of books?

<table>
<thead>
<tr>
<th>Number of Boxes</th>
<th>Number of Books</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
</tr>
</tbody>
</table>

   A $n + b = 8$
   B $n - b = 8$
   C $n = 8b$
   D $\frac{n}{b} = 8$

3. Which phrase can be represented by the expression $5a - 9$?
   A the product of 5 and 9 less than $a$
   B 9 less than the product of 5 and $a$
   C the product of 5, $a$, and 9
   D 9 less than 5 plus $a$

4. Tara is going to type a paper that is 4,500 words long. She can type 30 words per minute. Which equation represents the length of time it will take Tara to type the paper?
   A $m \div 30 = 4,500$
   B $30 + m = 4,500$
   C $30m = 4,500$
   D $4,500 \times 30 = m$

5. A rainwater collection tank contained 40 inches of water. After 4 days of rain, the level had risen to 52 inches. Which equation can be used to determine the rate, $r$, of increase in the water level in inches per day?
   A $52 = 40 + 4r$
   B $40 = 52 + 4r$
   C $4 = (52 - 40)r$
   D $52 = 40 - 4r$

6. Jose wants to buy a pair of bowling shoes that are on sale for $37.50. He has a jar of nickels and a $20.00 bill. Which equation will help him figure out how many nickels he needs in order to have enough money to buy the bowling shoes?
   A $0.05n + 20.00 = 37.50$
   B $n + 20.00 = 37.50$
   C $5n + 20 = 37.50$
   D $5n + 2,000 = 375$
7. Which equation models “three less than twice a number is twelve”?
   A  \( n - 2(-3) = 12 \)
   B  \( 2n - 3 = 12 \)
   C  \( 3 - 2n = 12 \)
   D  \( 2n + 2 = 12 \)

8. A sound studio charges a $52 reservation fee and $26 per hour. Felipe paid a total of $130 to use the sound studio. Which equation can be used to find the total number of hours \( (h) \) during which Felipe used the studio?
   A  \( 26 + 52h = 130 \)
   B  \( 52 + 26h = 130 \)
   C  \( 52(26 + h) = 130 \)
   D  \( 26(h + 52) = 130 \)

9. The formula \( V = \frac{1}{3}\pi r^2h \) gives the volume of a cone with height \( h \) and a base of radius \( r \). What is the formula solved for \( h \)?
   A  \( h = \frac{V\pi r^2}{3} \)
   B  \( h = \frac{3V}{\pi r^2} \)
   C  \( h = \frac{V}{3\pi r^2} \)
   D  \( h = \frac{V\pi}{3r^2} \)

10. Brian says that every multiple of 7 is odd. Joe disagrees. Which of the following expressions could Joe use to convince Brian?
   A  \( 7 \times -1 \)
   B  \( 7 \times 7 \)
   C  \( 7 \times 2 \)
   D  not enough information

11. If \( y = 1 \), then \( (x + 5) \cdot y = x + 5 \). This is an application of which property?
   A  Inverse Property of Multiplication
   B  Identity Property of Multiplication
   C  Associative Property of Addition
   D  Commutative Property of Addition

12. Evaluate \( 4(b^2 - 4b) \) for \( b = 10 \).
   A  60
   B  200
   C  240
   D  400
13. Describe the result of multiplying two numbers with opposite signs.
   A Their product is less than \(-1\).
   B Their product is less than 0.
   C Their product is greater than 0.
   D Their product is greater than 1.

   \[2(3x + 4) - (3x - 2)\]
   A \(3x - 6\)
   B \(3x + 10\)
   C \(3x + 6\)
   D \(3x + 2\)

15. Simplify the algebraic expression
   \[2x + 3y - 4(2x - y)\]
   A \(10x + 2y - 4\)
   B \(-6x + 7y\)
   C \(-6x + 2y\)
   D \(-6x - y\)

16. Find the difference.
   \[6\frac{2}{3} - 3\frac{7}{9}\]
   A \(3\frac{8}{9}\)
   B \(3\frac{1}{9}\)
   C \(2\frac{8}{9}\)
   D \(2\frac{4}{9}\)

17. Simplify.
   \[(8m + 2) + (5m - 7) + m\]
   A \(13m - 5\)
   B \(14m - 9\)
   C \(13m - 9\)
   D \(14m - 5\)

18. Evaluate the expression \(|-2f| + |7g|\) for \(f = -5\) and \(g = -3\).
   A \(210\)
   B \(31\)
   C \(-11\)
   D \(-39\)
19. Between which two consecutive integers is $\sqrt{15.52}$?
   A 3 and 4
   B 4 and 5
   C 5 and 6
   D 6 and 7

20. Which of the following is false?
   A $5 < -3$
   B $-5 < -3$
   C $-5 < 3$
   D $5 > 3$

21. Find $\sqrt{41}$ to the nearest tenth.
   A 6.4
   B 6.5
   C 7.4
   D 7.5

22. What is the relationship between $|5|$ and $|-5|$ on a number line?
   A They are 5 units apart from each other.
   B $|5|$ is closer to zero than $|-5|$.
   C $|-5|$ is closer to zero than $|5|$.
   D They are both the same distance from zero.

23. Which of the following is true?
   A $\sqrt{85} < 9$
   B $8 < \sqrt{62}$
   C $\sqrt{\frac{16}{25}} > \sqrt{\frac{16}{4}}$
   D $\sqrt{121} < \sqrt{144}$

24. Tell whether the following statement is sometimes, always, or never true. $|−a| = |a|$?
   A sometimes
   B always
   C never
   D not enough information
25. Use inductive reasoning to describe the pattern.

2, −6, 18, −54

A Multiply the previous term by −2 and add −1.
B Multiply the previous term by −3.
C Add −3 to the previous term.
D Add −4 to the previous term.

26. Which of the following equations describes the pattern in the table below?

<table>
<thead>
<tr>
<th>Muffins</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost ($)</td>
<td>0.79</td>
<td>1.58</td>
<td>2.37</td>
<td>3.16</td>
<td>3.95</td>
</tr>
</tbody>
</table>

A  \[ C = M + 0.79 \]
B  \[ M = C + 0.79 \]
C  \[ C = 0.79M \]
D  \[ M = 0.79C \]

27. Joe borrowed $60 from Elena. He paid back $10 the first week and will continue paying $5 each week until he has repaid the $60. Which expression shows how much Joe owes, where \( b \) equals the number of weeks since Joe began to pay Elena back?

A  \[ 60 − 5(b − 1) \]
B  \[ 60 − 5b \]
C  \[ 50 − 5b \]
D  \[ 50 − 5(b − 1) \]

28. Solve \( 5h + 3 = 4 \) for \( h \).

A  \( h = \frac{1}{5} \)
B  \( h = -\frac{1}{5} \)
C  \( h = \frac{7}{5} \)
D  \( h = -\frac{7}{5} \)

29. Find \( q \) if \( \frac{2q}{5} + 3q = 5 \).

A  0.66
B  1.5
C  2
D  6

30. Find \( k \) if \( 9k − 23 = 5k + 45 \).

A  68
B  22
C  17
D  5.5
31. Solve $8a - 3 = 21$.
   A $\frac{1}{3}$
   B 3
   C $\frac{8}{3}$
   D 8

32. Find $d$ if $2(d - 4) = -2d + 8$.
   A $-4$
   B $-2$
   C 2
   D 4

33. If the perimeter of the triangle is equal to the perimeter of the square, then the length of a side of the square is ___.

   \[
   \begin{align*}
   &16 \quad 4x - 3 \\
   &3x
   \end{align*}
   \]

   \[
   \begin{align*}
   &2x \quad 2x
   \end{align*}
   \]

   A 7
   B 13
   C 26
   D 52

34. If 1 km = 1,000 m, how many kilometers is 600 meters?
   A 0.006 km
   B 0.6 km
   C 6,000 km
   D 600,000 km

35. The formula $F = \frac{9}{5}C + 32$ gives the Fahrenheit $F$ temperature in terms of Celsius $C$ temperature. What is the Celsius temperature when the Fahrenheit temperature is 50°?
   A 122°
   B 32°
   C 18°
   D 10°

36. Express the rate 120 ft in 3 s as miles per hour. Round your answer to the nearest tenth of a mile.
   A 27.3 mi/h
   B 24.7 mi/h
   C 2.7 mi/h
   D 1.4 mi/h
## Standards Progress Test 1 Report

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Items</th>
<th>Number Correct</th>
<th>Proficient?</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>1-1, 1-9</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.2 Write an equation symbolically to express a contextual problem.</td>
<td>4, 5, 6, 7, 8, 9</td>
<td>6</td>
<td>2-1, 2-2, 2-3</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.</td>
<td>10, 11, 12, 13, 14, 15, 16, 17, 18</td>
<td>9</td>
<td>1-4, 1-5, 1-6, 1-7</td>
<td></td>
</tr>
<tr>
<td><strong>Number and Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.2.3 Describe and/or order a given set of real numbers including both rational and irrational numbers.</td>
<td>19, 20, 21, 22, 23, 24</td>
<td>6</td>
<td>1-3</td>
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</tr>
<tr>
<td><strong>Algebra</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>25, 26, 27</td>
<td>3</td>
<td>1-9</td>
<td></td>
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<tr>
<td>SPI 3102.3.5 Write and/or solve linear equations, inequalities, and compound inequalities including those containing absolute value.</td>
<td>28, 29, 30, 31, 32, 33</td>
<td>6</td>
<td>2-3, 2-4</td>
<td></td>
</tr>
<tr>
<td><strong>Geometry and Measurement</strong></td>
<td></td>
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<tr>
<td>SPI 3102.4.4 Convert rates and measurements.</td>
<td>34, 35, 36</td>
<td>3</td>
<td>2-6</td>
<td></td>
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</table>

**Student Comments:**

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1. Allana is stacking paint cans for a display. If she follows the pattern shown in the chart, how many cans will she use for the bottom row?

<table>
<thead>
<tr>
<th>Row</th>
<th>Number of cans</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 (top)</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>1 (bottom)</td>
<td>?</td>
</tr>
</tbody>
</table>

A 18 cans  
B 20 cans  
C 22 cans  
D 25 cans

2. Is the sequence arithmetic? If so, what is the common difference?

-0.5, 3.5, 7.5, . . .  
A no  
B yes, 3.0  
C yes, 3.5  
D yes, 4.0

3. Three instances of a pattern are given. Which equation is a general description of the pattern using one variable?

\[ 4 + 6 = 2^2 + 6 \]
\[ 4 + (-5) = 2^2 + (-5) \]
\[ 4 + 0 = 2^2 + 0 \]
A \[ 4 + x = 2^2 + x \]
B \[ 4 - x = 2^2 + x \]
C \[ 4 + x = 2^2 + (-x) \]
D \[ 4 \times x = 2^2 \times x \]

4. Which of the following equations describes the pattern in the table below?

<table>
<thead>
<tr>
<th>Weeks (W)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings (S)</td>
<td>35</td>
<td>50</td>
<td>65</td>
<td>80</td>
<td>95</td>
</tr>
</tbody>
</table>

A \[ S = 35 + 15W \]
B \[ S = 20 + 15W \]
C \[ S = 15 + 20W \]
D \[ S = 15 + 35W \]

5. Which equation could you use to find the next term in the pattern 6, 12, 54, 384, . . . ?

A \[ A(n) = 2 \cdot 3n^{n-1} \]
B \[ A(n) = 2 \cdot 3n^n \]
C \[ A(n) = 2n^2 \]
D \[ A(n) = 2n^{n-1} \]

6. Which of the following rules describes the arithmetic sequence below?

5, 1.5, -2, -5.5, -9, . . .  
A \[ A(n) = 5 + (n - 1)(-4.5) \]
B \[ A(n) = 5 + (n - 1)(-3.5) \]
C \[ A(n) = 2.5 + (n - 1)(5) \]
D \[ A(n) = 3.5 + (n - 1)(5) \]

7. The data in the table describe a linear relationship. Which equation represents the data in the table?

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>-1</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

A \[ y = x - 1 \]
B \[ y = x + 1 \]
C \[ y = 3x - 1 \]
D \[ y = 3x \]
8. The amount of money Camille can save by the end of summer is given by the function $y = 8.5x + 15l + 100$, where $x$ is the number of hours she works at the bookstore and $l$ is the number of times she mows her neighbor’s lawn. Which is the best interpretation of this function?
   A. She makes $8.50 per hour she works at the bookstore and $15.00 each time she mows her neighbor’s lawn.
   B. She makes $15.00 per hour she works at the bookstore and $8.50 each time she mows her neighbor’s lawn.
   C. She makes $15.00 per hour she works at the bookstore and $100.00 each time she mows her neighbor’s lawn.
   D. She makes $8.50 per hour she works at the bookstore and $100.00 each time she mows her neighbor’s lawn.

9. Which of the following is a function rule for the table shown below?

<table>
<thead>
<tr>
<th>$x$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>97.5</td>
<td>85</td>
<td>72.5</td>
<td>60</td>
<td>47.5</td>
</tr>
</tbody>
</table>

A. $y = 110 - 12.5x$
B. $y = 12.5x + 110$
C. $y = 97.5 + 12.5x$
D. $y = 12.5x + 97.5$

10. Kate has $75 to spend on souvenirs during her vacation. She decides to spend $7 per day. Write an equation giving the amount she has left after $x$ days.
   A. $y = 75 - 7x$
   B. $y = 7 + 75x$
   C. $y = 7 - 75x$
   D. $y = 75 + 7x$

11. Tara bought an aquarium for $30. Fish cost $2 each. Which equation represents the total cost $y$ of buying an aquarium and $x$ fish?
   A. $y = 2x - 30$
   B. $y = 2x + 30$
   C. $y = 30x - 2$
   D. $y = 30x + 2$

12. The temperature was $-5^\circ F$ at noon, and then decreased 2 degrees per hour. Which equation can be used to find the temperature $h$ hours after noon?
   A. $T = 2h + 5$
   B. $T = 2h - 5$
   C. $T = -2h + 5$
   D. $T = -2h - 5$

13. Justin bought a seedling that was 3 inches tall. It grew 2 inches each week. Which equation represents the height of Justin’s plant $y$ at any given week $x$?
   A. $y = 2x$
   B. $y = 2x + 3$
   C. $y = 3x$
   D. $y = 3x + 2$

14. Which situation could the equation $y = 20x + 80$ represent?
   A. You bought a CD player for $80 and then bought $20 worth of CDs.
   B. You have paid $20 toward a new television and plan to pay $80 more each month.
   C. You received 2 gift certificates for $20 for your birthday and already had saved $80 worth of gift certificates.
   D. You have saved $80 and add $20 to your savings each month.
15. The table shows Victor’s wages as a function of the number of hours he works in a week. Overtime pay begins after 40 hours worked in one week. What is Victor’s overtime pay rate?

<table>
<thead>
<tr>
<th>Hours Worked</th>
<th>Wages ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$140</td>
</tr>
<tr>
<td>20</td>
<td>$280</td>
</tr>
<tr>
<td>30</td>
<td>$420</td>
</tr>
<tr>
<td>40</td>
<td>$560</td>
</tr>
<tr>
<td>50</td>
<td>$740</td>
</tr>
<tr>
<td>60</td>
<td>$920</td>
</tr>
</tbody>
</table>

A $10/hr  
B $14/hr  
C $18/hr  
D $180/hr

16. Lauri rides her bicycle every weekend. The graph shows the distance traveled and the amount of time spent riding on Saturday.

Which equation is the rule of the graph?

A $y = 0.1x$  
B $y = 0.2x$  
C $y = 10x$  
D $y = 20x$

17. A stockbroker charges $50 to open a special money market account and $4 per account transaction. Which function $A$ describes the cost for opening an account and making $t$ account transactions?

A $A = 50 + 4t$  
B $A = 50 + t$  
C $A = 4 + 4t$  
D $A = 50 - 4t$

18. Janie studies 3 hours for each of her classes. Her total study time $t$ can be expressed by the function $t = 3c$, where $c$ is the number of classes. Which statement is true?

A The number of classes she takes depends on the number of hours she studies.  
B The number of hours she studies depends on the number of classes she takes.  
C The number of hours she spends in class depends on the number of hours she studies for each class.  
D The number of classes she takes is always three times the number of hours she studies.

19. Baily has a monthly allowance of $80. She pays $30 per month for gasoline and $15 for each hour that she rents a recording studio. Which inequality represents $h$, the number of hours she can rent the recording studio per month?

A $15 + 30h \leq 80$  
B $30 + 15h \leq 80$  
C $15h \leq 80 + 30$  
D $30 + 15h \geq 80$
20. Brandi does not want to spend more than $20.00 to rent a canoe at a lake near her house. The cost of renting a canoe is $6.50 for the first hour and $3.75 for each additional hour. What is the maximum number of hours that Brandi can rent a canoe?
   A 3  
   B 4  
   C 5  
   D 6

21. Solve $-8d - 5 \leq 2d - 3$.
   A $d \geq -5$  
   B $d \geq \frac{-1}{5}$  
   C $d \leq -5$  
   D $d \leq \frac{-1}{5}$

22. In which set is each number a solution of $2 + 2x \leq 6$?
   A {3, 4, 5}  
   B {2, 4, 6}  
   C {-2, 2, 6}  
   D {-4, -2, 0}

23. Give the solution to $2 - 3 |4 + x| \geq -19$.
   A $-11 \leq x \leq 3$  
   B $x \leq -11$ or $x \geq 3$  
   C $x \leq 3$  
   D $x \geq -11$

24. A certain type of part for a machine needs to be 1.500 in. long, and must be manufactured to be within 0.001 in. Which inequality represents $x$, the range of possible lengths of the part?
   A $|x - 1.500| \leq 0.001$  
   B $|x - 1.500| \geq 0.001$  
   C $|x - 0.001| \leq 1.500$  
   D $|x - 0.001| \geq 1.500$

25. Solve $x + 4 < 1$ and graph the solutions on a number line.
   A $x > 5$  
   B $x < 5$  
   C $x > -3$  
   D $x < -3$

26. For which inequality does the graph show the solution?
   A $3x - 17 < -2$  
   B $4x - 9 > 3$  
   C $8 < 2x + 5$  
   D $-7 > 5x + 8$

27. A box of cereal is supposed to weigh 15 oz. The quality-control standard is that all boxes of cereal must weigh within 0.25 oz of the ideal weight. What is the range of allowable weights $w$ of a box of cereal in ounces?
   A $14 < w < 15$  
   B $14.75 < w < 15.25$  
   C $15 < w < 15.25$  
   D $15.25 < w < 15.5$
28. Which of the following is most likely represented by this graph?

A a lawn mower that runs out of gas
B the outdoor temperature on a hot day as it approaches noon
C your speed as you jog and then go up a steep hill
D the weight of a turtle

29. Which graph best represents temperatures likely to occur over a few days?

A

B

C

D

30. Henry bought a used lawn mower for $75 to start up a summer lawn mowing business. He charged $25 for each lawn he mowed. Which graph represents Henry’s profit during the summer?
31. Choose the description of a graph of an equation.
   A  The graph of an equation is a drawing that represents its solution set.
   B  The graph of an equation is a drawing that represents only its domain.
   C  The graph of an equation is a drawing that represents only its range.
   D  The graph of an equation is a drawing that represents only its midpoint.

32. Which relation is not a function?
   A  \{(1, -5), (2, -4), (1, -4)\}
   B  \{(1, -5), (2, -4), (3, -3)\}
   C  \{(1, -5), (2, -4), (3, 2)\}
   D  \{(1, -5), (2, -4), (3, -4)\}

33. If \(f(x) = |x + 2|\), then \(f(-3) = \) ?.
   A  1
   B  -1
   C  -5
   D  5

34. Find the range \(r\) of the relation.

   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   1 & 1 \\
   1 & 3 \\
   2 & 5 \\
   2 & 7 \\
   3 & 9 \\
   \end{array}
   \]
   A  \(r = \{1, 3\}\)
   B  \(r = \{1, 2, 3\}\)
   C  \(r = \{1, 3, 5, 7, 9\}\)
   D  \(r = \{1, 2, 3, 5, 7, 9\}\)

35. Which is not the graph of a function?

36. The average distance a swimmer swims can be described by the equation \(d = 30t\), where \(d\) is the horizontal distance in meters and \(t\) is the time in minutes. Find the distances the swimmer swims at the times of 7, 10, 14, and 20 minutes.
   A  37 m, 40 m, 44 m, and 50 m
   B  210 m, 300 m, 420 m, and 600 m
   C  \(\frac{7}{30}\) m, \(\frac{1}{3}\) m, \(\frac{7}{15}\) m, \(\frac{2}{3}\) m
   D  23 m, 20 m, 16 m, and 10 m
## Standards Progress Test 2 Report

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Items</th>
<th>Number Correct</th>
<th>Proficient? Yes or No</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
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<td>6</td>
<td></td>
<td>4-2, 4-3, 4-7</td>
</tr>
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<td>7, 8, 9, 10, 11, 12</td>
<td>6</td>
<td></td>
<td>4-5</td>
</tr>
<tr>
<td>SPI 3102.1.4 Translate between representations of functions that depict real-world situations.</td>
<td>13, 14, 15</td>
<td>3</td>
<td></td>
<td>4-4, 4-5</td>
</tr>
<tr>
<td><strong>Algebra</strong></td>
<td></td>
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<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>16, 17, 18</td>
<td>3</td>
<td></td>
<td>4-2</td>
</tr>
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<td>9</td>
<td></td>
<td>3-2, 3-4, 3-6, 3-7</td>
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<tr>
<td>SPI 3102.3.6 Interpret various relations in multiple representations.</td>
<td>28, 29, 30</td>
<td>3</td>
<td></td>
<td>4-1</td>
</tr>
<tr>
<td>SPI 3102.3.7 Determine domain and range of a relation, determine whether a relation is a function and/or evaluate a function at a specified rational value.</td>
<td>31, 32, 33, 34, 35, 36</td>
<td>6</td>
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**Student Comments:**

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1. Which equation is parallel to $y = 3x + 6$?
   A $y = 3x + 8$
   B $y = -3x + 8$
   C $y = \frac{1}{3}x + 8$
   D $y = -\frac{1}{3}x + 8$

2. The temperature $t$ of a cup of soup over time $m$ is represented by the equation $t = -8m + 112$. Which statement correctly explains the values $-8$ and $112$ in the equation?
   A The soup is $8^\circ$ cooler than $112^\circ$F.
   B Eight minutes after the soup is served, its temperature is $112^\circ$F.
   C The temperature of the soup started at $112^\circ$F and is dropping by $8^\circ$F per minute.
   D The temperature of the soup was $112^\circ$F eight minutes before it was served.

3. Given the linear function $y = \frac{2}{3}x + 2$, which of the graphs below represents the linear function if its slope is halved and its $y$-intercept is opposite?
4. Find the slope of the line $y = -4x - 6$.
   A  $-4$
   B  $6$
   C  $-6$
   D  $4$

5. Find the slope of the line.
   
   \[ \frac{3}{2} \]  \quad \[ \frac{-2}{3} \]
   \[ \frac{2}{3} \]  \quad \[ \frac{-3}{2} \]

6. The temperature in an oven was 75°F before the oven was turned on. Twenty minutes later, the temperature was 105°F. What was the rate of increase in temperature?
   A  0.66°F per minute
   B  1°F per minute
   C  1.5°F per minute
   D  20°F per minute

7. Which of the following sets of ordered pairs could be part of a linear function?
   A  $(0, 0), (3, 2), (6, 5), \left(1, \frac{2}{3}\right)$
   B  $(1, 4), (2, 2), (4, 1), \left(8, \frac{1}{2}\right)$
   C  $(-2, 4), (1, 1), (3, 9), (5, 25)$
   D  $(0, -1), (2, 3), (5, 9), (4, 7)$

8. Which equation is graphed below?
   
   \[ -2x + y = -1 \]
   \[ 2x + y = -1 \]
   \[ \frac{1}{2}x + y = -1 \]
   \[ -\frac{1}{2}x + y = -1 \]

9. What is the equation of a line that passes through $(1, -4)$ and $(2, 7)$?
   A  $y = x + 5$
   B  $y = x - 5$
   C  $y = 11x + 8$
   D  $y = 11x - 15$

10. A direct variation contains the point $(9, -12)$. Which of the following is another point for the same direct variation?
    A  $(6, 8)$
    B  $(1, -4)$
    C  $(1, -1.75)$
    D  $(-1.5, 2)$

11. The graph of which equation would be perpendicular to a line with a slope of $\frac{1}{5}$?
    A  $y = -5x + 2$
    B  $y = -\frac{1}{5}x + 3$
    C  $y = 5x - 2$
    D  $5y + x = 2$
12. Two lines go through the point (2, 2). The first also goes through (5, 3) while the other also goes through (3, −1). Which of these statements is true?
   A. The lines both have a positive slope.
   B. The two lines are parallel.
   C. The lines also intersect at another point.
   D. The two lines are perpendicular.

13. Which equation does the graph below model?

   ![Graph](image)

   A. \( y = 3x + 2 \)
   B. \( y = -3x + 2 \)
   C. \( y = 3x - 2 \)
   D. \( y = -3x - 2 \)

14. Give the equation of the line that is parallel to the line \( y = 5x + 2 \) and passes through the point \((1, -3)\).

   A. \( y = -5x + 2 \)
   B. \( y = 5x + 8 \)
   C. \( y = \frac{1}{5}x - 8 \)
   D. \( y = 5x - 8 \)

15. A line goes through the point \((1, 3)\) and has a slope of \(-\frac{2}{3}\). Which of the lines graphed below is perpendicular to this line?

   ![Graphs](images)

   A. [Graph A]
   B. [Graph B]
   C. [Graph C]
   D. [Graph D]
16. Solve the system by graphing.

\[
\begin{align*}
    x + y &= 4 \\
    y &= 3x + 4
\end{align*}
\]

A

B

C

D

17. Solve the system below.

\[
\begin{align*}
    x + y &= -5 \\
    y &= 4x - 5
\end{align*}
\]

A (0, 5)  
B (0, -5)  
C (-5, 0)  
D (5, 0)

18. Country Kennels charges $85 per day to keep one dog and three cats. To keep two dogs and two cats, they charge $90 per day. How much does it cost to keep one dog per day?

A $20  
B $25  
C $40  
D $55

19. The scatter plot would be most useful to show which of the following?

A As age increases, weight decreases.  
B As age increases, weight increases.  
C As age decreases, weight increases.  
D There is no relationship between age and weight.
20. The table below shows the number of people swimming in a lake as compared to the daily high temperatures in one week.

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>78</th>
<th>86</th>
<th>88</th>
<th>90</th>
<th>90</th>
<th>95</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>15</td>
<td>19</td>
<td>22</td>
<td>25</td>
<td>17</td>
<td>27</td>
<td>31</td>
</tr>
</tbody>
</table>

Which scatter plot correctly shows this data?

A

B

C

D

21. A school principal is looking for a relationship between the number of days students were absent from their Algebra I class and their scores on the course’s final exam. He plotted the data in the scatter plot shown below.

Which of the following equations produces the line that best fits the data?

A $y = 90 - 3x$
B $y = 92 - 5x$
C $y = 100 - 5x$
D $y = 90 - x$

22. What type of relationship exists between the data in the scatter plot?

A negative correlation
B positive correlation
C no correlation
D constant correlation
23. What type of trend is shown by the scatter plot below?

![Scatter Plot](scatter_plot_image)

A. negative  
B. opposite  
C. none  
D. positive

24. Niccola records the scores of her classmates on a recent test. She also records the amount of time each student spent studying for the test. If she displays the data in a scatter plot, what type of relationship will she most likely see?

A. negative correlation  
B. no correlation  
C. constant correlation  
D. positive correlation

25. Look at the scatter plot below.

![Scatter Plot](scatter_plot_image)

Which of these lines best represents this data?

A. \( y = 2x \)  
B. \( y = x + 2 \)  
C. \( y = \frac{1}{2}x \)  
D. \( y = \frac{1}{2}x + 2 \)

26. Which line would be a reasonable line of best fit for the data graphed in the scatter plot?

![Scatter Plot](scatter_plot_image)

A. line \( a: y = 2x - 4 \)  
B. line \( b: y = 2x - 6 \)  
C. line \( c: y = 0.73x + 0.6 \)  
D. line \( d: y = 0.73x - 0.4 \)

27. This scatter plot shows recorded temperatures on the same day at several different locations at differing elevations.

![Scatter Plot](scatter_plot_image)

About what temperature, in degrees Celsius, would you expect at an elevation of 3000 meters?

A. 10  
B. 15  
C. 30  
D. 45
# Standards Progress Test 3 Report

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Items</th>
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<th>Proficient? Yes or No</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
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</thead>
<tbody>
<tr>
<td><strong>Mathematical Processes</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SPI 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.</td>
<td>1, 2, 3</td>
<td>3</td>
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<td>5-3, 5-6</td>
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<tr>
<td>SPI 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.</td>
<td>4, 5, 6</td>
<td>3</td>
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<td>5-1, 5-3</td>
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<tr>
<td><strong>Algebra</strong></td>
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<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>7, 8, 9</td>
<td>3</td>
<td></td>
<td>5-4</td>
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<tr>
<td>SPI 3102.3.6 Interpret various relations in multiple representations.</td>
<td>10, 11, 12</td>
<td>3</td>
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<td>5-2, 5-6</td>
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<tr>
<td>SPI 3102.3.8 Determine the equation of a line and/or graph a linear equation.</td>
<td>13, 14, 15</td>
<td>3</td>
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<td>5-3, 5-6</td>
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<tr>
<td>SPI 3102.3.9 Solve systems of linear equation/inequalities in two variables.</td>
<td>16, 17, 18</td>
<td>3</td>
<td></td>
<td>6-1, 6-2, 6-4</td>
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<tr>
<td><strong>Data Analysis, Statistics, and Probability</strong></td>
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<tr>
<td>SPI 3102.5.1 Interpret displays of data to answer questions about the data set(s) (e.g., identify pattern, trends, and/or outliers in a data set).</td>
<td>19, 20, 21</td>
<td>3</td>
<td></td>
<td>5-7</td>
</tr>
<tr>
<td>SPI 3102.5.3 Using a scatter-plot, determine if a linear relationship exists and describe the association between variables.</td>
<td>22, 23, 24</td>
<td>3</td>
<td></td>
<td>5-7</td>
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<tr>
<td>SPI 3102.5.4 Generate the equation of a line that fits linear data and use it to make a prediction.</td>
<td>25, 26, 27</td>
<td>3</td>
<td></td>
<td>5-7</td>
</tr>
</tbody>
</table>
1. Which of the following is an exponential growth function?
   A \( f(x) = \frac{1}{2}(4)^x \)
   B \( f(x) = 3\left(\frac{1}{2}\right)^x \)
   C \( f(x) = 3x^3 \)
   D \( f(x) = 2x^2 + 1 \)

2. Which of the following equations models exponential decay?
   A \( y = \frac{1}{4} \cdot 300^x \)
   B \( y = 0.005 \cdot 5^x \)
   C \( y = 300 \cdot 6^x \)
   D \( y = 450 \cdot \left(\frac{2}{3}\right)^x \)

3. Which equation best models the data in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-( \frac{1}{4} )</td>
</tr>
<tr>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>1</td>
<td>-4</td>
</tr>
<tr>
<td>2</td>
<td>-16</td>
</tr>
<tr>
<td>3</td>
<td>-64</td>
</tr>
</tbody>
</table>

   A \( f(x) = 4^x \)
   B \( f(x) = -4^x \)
   C \( f(x) = x^4 \)
   D \( f(x) = -x^4 \)

4. The function graphed below could be which of the following?

5. Which equation best models the data in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>( \frac{1}{4} )</td>
</tr>
<tr>
<td>-1</td>
<td>( \frac{1}{2} )</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

   A \( f(x) = 2^x \)
   B \( f(x) = -2^x \)
   C \( f(x) = x^2 \)
   D \( f(x) = -x^2 \)
6. Suppose you invest $6200 in an account that has an annual yield of 8.6%. Which equation models the amount in the account after 6 years?
   A  $f(x) = 1.086 \cdot (6200)^6$
   B  $f(x) = 0.086 \cdot (6200)^6$
   C  $f(x) = 6200 \cdot (1.086)^6$
   D  $f(x) = 6200 \cdot (0.086)^6$

7. Carrie inherited $6,300 and invested it in an account with an annual interest rate of 5.5%. How much greater was Carrie's balance after 5 years than it was after 2 years?
   A  $346.50$
   B  $1,094.82$
   C  $1,221.79$
   D  $7,397.72$

8. The population in a European city was about 152,494 in 2002 and is decreasing at a rate of 1% per year. The population in an Asian city was about 175,630 in 2002 and its population is also decreasing at a rate of 1% per year. How many more people did the Asian city have than the European city in 2005?
   A  22,450
   B  22,675
   C  23,136
   D  23,837

9. A bank account with a starting balance of $800 earns 6% annual interest, compounded monthly. How much greater was the balance after 4 years than after 2 years?
   A  $114.66$
   B  $111.10$
   C  $96.00$
   D  $8.10$

10. Multiply.
    \((2.4 \times 10^6)(3 \times 10^2)\)
    A  \(7.2 \times 10^3\)
    B  \(7.2 \times 10^4\)
    C  \(7.2 \times 10^8\)
    D  \(7.2 \times 10^{12}\)

11. Simplify.
    \(\frac{8.7 \times 10^8}{2.9 \times 10^2}\)
    A  \(3 \times 10^4\)
    B  \(3 \times 10^6\)
    C  \(3 \times 10^{10}\)
    D  \(3 \times 10^{16}\)

12. Divide.
    \(\frac{6.2 \times 10^{-4}}{3 \times 10^6}\)
    A  \(2.1 \times 10^{-24}\)
    B  \(2.1 \times 10^{-10}\)
    C  \(2.1 \times 10^{-2}\)
    D  \(2.1 \times 10^2\)
13. The equation \( A = 300(1.06)^x \) represents the amount in a savings account \( x \) years after the account is opened. How much will be in the account after 4 years?
   A $322.34
   B $372.00
   C $378.74
   D $401.46

14. The equation \( V = 2000 \cdot 1.07^x \) models the expected value of a painting \( x \) years after it was made. How much is the painting expected to be worth after 25 years?
   A $5500
   B $10,854.87
   C $11,000
   D $18,762.39

15. The population of a small town can be modeled using the equation \( P = 12,000 \cdot \left( \frac{7}{8} \right)^x \) where \( x \) is in years.
   One year, the population was 9,187. Which of the following was the population a year later?
   A 8,039
   B 7,033
   C 6,154
   D 5,384

   \[(4y^3 - 2y^2 + 2y - 3) - (2y^3 - 3y^2 - 2y)\]
   A \(2y^3 + y^2 + 4y - 3\)
   B \(4y^3 - 5y^2 + 6y - 3\)
   C \(4y^3 + y^2 - 2y\)
   D \(2y^3 + 5y^2 + 4y - 3\)

17. A circular pond has a radius of \(2x - 3\). Which expression describes the area of the pond?
   A \((4x - 6)\pi\)
   B \((4x + 9)\pi\)
   C \((4x^2 + 12x - 9)\pi\)
   D \((4x^2 - 12x + 9)\pi\)

18. Simplify the algebraic expression
   \[7x(x^2 + 2) + 5(x - 3)\].
   A \(7x^3 + 19x - 15\)
   B \(7x^3 + 5x - 1\)
   C \(7x^3 + 35x^2 - 91\)
   D \(7x^2 + 5x - 5\)

19. Which algebraic expression is equivalent to \(x(2x^2 + 1) + 2(x^2 + 1)\)?
   A \(2x^3 + 2x^2 + 2x + 2\)
   B \(2x^3 + 2x^2 + x + 2\)
   C \(2x^3 + x^2 + 2x + 2\)
   D \(2x^3 + x^2 + x + 2\)
20. Subtract.

\[(x^2 + 6x - 8) - (-3x^2 + 2x - 9)\]

A 4x^2 + 4x + 1
B -2x^2 + 4x + 1
C 4x^2 + 4x + 17
D 4x^2 + 8x + 17

21. Which expression represents the volume of the figure shown?

\[
\begin{array}{c}
\text{x} \\
\text{x + 2} \\
\text{x + 4}
\end{array}
\]

A \(x^2 + 2x\)
B \(x^2 + 2x + 6\)
C \(x^3 + 6x^2 + 8x\)
D \(x^3 + 6x^2 + 8\)

22. Which polynomial is the sum of \((x^3 - 10x^2 + x - 4) + (2x^3 + 4x^2 - x - 4)\)?

A 3x^3 + 6x^2 + 2x
B 2x^3 - 6x^2 + 2x - 8
C 3x^3 - 6x^2 - 8
D \(x^3 + 6x^2 + 2x\)

23. Which of the following is the product of \(5y(y^2 + 7y - 5)\)?

A 5y^3 + 35y - 25
B 5y + 35
C 5y^3 + 35y^2 - 25y
D 6y^2 + 35y - 25

24. Which of the following is the product of \(6m(m^3 - 4m^2 + m - 7)\)?

A 6m^4 + 24m^3 - 6m^2 + 7
B \(m^3 - 4m^2 + 7m - 7\)
C 6m^4 - 24m^3 - 6m^2 - 42m
D 18m^3 - 24m^2 + 6m - 42

25. Factor the expression.

\(6x + 4\)

A 2(3x + 2)
B 2(3x + 2)
C 3(2x + 2)
D \(x(6 + 4)\)

26. A square has an area of \(x^2 - 8x + 16\). Write an expression for the length of a side of the square.

A \(x - 8\)
B \(x + 4\)
C \(x - 4\)
D \(x + 16\)
27. A square has an area of $16x^2 + 8x + 1$. Write an expression for the length of a side of the square.
   A $x + 1$
   B $2x + 1$
   C $4x + 1$
   D $8x + 1$

28. Raquel used algebra tiles to model the trinomial $x^2 + 5x + 6$ as shown below.
   
   What are the factors of this trinomial?
   A $(x + 5)(x + 2)$
   B $(x + 3)(x + 2)$
   C $(x + 5)(x + 6)$
   D $(x + 1)(x + 3)$

29. The square below has an area of $(4s^2 + 24s + 36)$ in.². Write an expression for the length of a side of the square in inches.
   
   \[ \text{Area} = 4s^2 + 24s + 36 \]

   A $s + 6$
   B $s + 2$
   C $2s + 2$
   D $2s + 6$

30. The polynomial $12a^2 + a - 35$ can be factored into which two products?
   A $(6a - 7)(2a + 5)$
   B $(12a + 7)(a - 5)$
   C $(4a + 7)(3a - 5)$
   D $(3a - 7)(4a + 5)$

31. To factor $12x^2 - 40x - 7$ by grouping, you first find two integers whose product is _____ and whose sum is ______. 
   A 40, 5
   B $-84, -40$
   C $144, -47$
   D $-336, 1600$
32. Which of the following shows the complete factorization of $6x^2 - 216$?
   A. $6(x - 6)(x + 6)$
   B. $(6x - 36)(6x + 36)$
   C. $6(x - 6)$
   D. $(6x - 36)(x + 6)$

33. Find the greatest common factor of the terms in $14a^2b^3 + 42a^5b^2$.
   A. $7ab$
   B. $7a^2b^2$
   C. $14a^3b^3$
   D. $14a^2b^2$

34. $x^2 + 5x + 6 = \ ?$
   A. $(x - 2)(x - 3)$
   B. $(x + 2)(x + 3)$
   C. $(x - 1)(x + 6)$
   D. $(x + 1)(x + 6)$

35. Find the greatest common factor of the terms in $9c^3 + 6c^2 - 12c$.
   A. $3$
   B. $3c$
   C. $9$
   D. $9c$

36. Factor by grouping.
    $6x^3 - 27x^2 + 2x - 9$
   A. $(2x + 9)(3x^2 - 1)$
   B. $3(2x^2 + 1)(x - 3)$
   C. $3(x + 3)(2x^2 - 1)$
   D. $(3x^2 + 1)(2x - 9)$
## Standards Progress Test 4 Report

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Items</th>
<th>Number Correct</th>
<th>Proficient? Yes or No</th>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SPI 3102.1.2 Write an equation symbolically to express a contextual problem.</td>
<td>1, 2, 3</td>
<td>[ ] 3</td>
<td>Yes</td>
<td>7-7</td>
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<tr>
<td>SPI 3102.1.4 Translate between representations of functions that depict real-world situations.</td>
<td>4, 5, 6</td>
<td>[ ] 3</td>
<td>No</td>
<td>7-6</td>
</tr>
<tr>
<td>SPI 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.</td>
<td>7, 8, 9</td>
<td>[ ] 3</td>
<td>Yes</td>
<td>7-7</td>
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<td><strong>Number and Operations</strong></td>
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<tr>
<td>SPI 3102.2.2 Multiply, divide, and square numbers expressed in scientific notation.</td>
<td>10, 11, 12</td>
<td>[ ] 3</td>
<td>No</td>
<td>7-3, 7-5</td>
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<tr>
<td><strong>Algebra</strong></td>
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<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>13, 14, 15</td>
<td>[ ] 3</td>
<td>Yes</td>
<td>7-6</td>
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<td>SPI 3102.3.2 Operate with polynomials and simplify results.</td>
<td>16, 17, 18, 19, 20, 21, 22, 23, 24</td>
<td>[ ] 9</td>
<td>Yes</td>
<td>8-1, 8-2, 8-3, 8-4</td>
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<td>SPI 3102.3.3 Factor polynomials.</td>
<td>25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36</td>
<td>[ ] 12</td>
<td>Yes</td>
<td>8-2, 8-5, 8-6, 8-7, 8-8</td>
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**Student Comments:**

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Parent Comments:

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Teacher Comments:

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1. Which equation represents a graph that opens downward and has a vertex six units above the origin?
   A. \( y = -2x^2 + 6 \)
   B. \( y = -(6x^2 + 6) \)
   C. \( y = -6x^2 - 2 \)
   D. \( y = 4(x^2 - 6) \)

2. Which function describes the values in the table?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
</tr>
</tbody>
</table>

   A. \( y = x^2 - 1 \)
   B. \( y = \frac{1}{2}x^2 - 2 \)
   C. \( y = 2x^2 - 2 \)
   D. \( y = \frac{1}{2}x^2 + x + 1 \)

3. The length of the leg of a right triangle is 1 more than the length of the other leg. The hypotenuse has a length of 5. Which of the following functions can be used to find the area of the triangle?

   A. \( A(x) = \frac{1}{2}x(x + 1) \)
   B. \( A(x) = 5(x + 1)^2 \)
   C. \( A(x) = \frac{5}{2}x(x + 1) \)
   D. \( A(x) = x^2 + x \)

4. A model rocket is launched with an initial velocity of 64 feet per second. The graph shows the height of the rocket \( h(t) \) in terms of the time, \( t \), since it was launched. What is the maximum height the rocket reached?

   A. 48 feet
   B. 60 feet
   C. 64 feet
   D. 80 feet

Height of a Rocket

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Height (feet)</th>
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</thead>
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<tr>
<td>1</td>
<td>16</td>
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<td>2</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>64</td>
</tr>
</tbody>
</table>
5. An arrow is shot upward with an initial velocity of 48 feet per second. The graph below shows the height of the arrow $h(t)$ in terms of the time, $t$, since the arrow was shot. How many seconds after the arrow was shot did it reach its maximum height?

![Height of an Arrow Graph]

Height of an Arrow

A. 1 second  
B. 1.5 seconds  
C. 2 seconds  
D. 2.5 seconds

6. Look at the graph below.

Which equation represents the graph?
A. $y = 2x + 3$  
B. $y = x^2 + 3$  
C. $y = x^3$  
D. $y = 3^x$

7. If $f(x) = -3x^2 + 6$ and the graph of $g(x)$ is translated 4 units down from $f(x)$, what function defines $g(x)$?
A. $g(x) = -3x^2 - 4$  
B. $g(x) = -3x^2 - 2$  
C. $g(x) = -3x^2 + 2$  
D. $g(x) = -3x^2 + 4$

8. How does the graph of $g(x)$ compare to the graph of $f(x)$?

- $f(x) = 3x^2 - 2$
- $g(x) = x^2 - 2$
A. The graph of $g(x)$ is wider than the graph of $f(x)$.
B. The graph of $g(x)$ is narrower than the graph of $f(x)$.
C. The graph of $g(x)$ is translated 3 units up from the graph of $f(x)$.
D. The graph of $g(x)$ is translated 3 units to the right of the graph of $f(x)$.

9. How does the graph of $y = \frac{1}{6}x^2 + 6$ differ from the graph of $y = x^2$?

A. The graph of $y = \frac{1}{6}x^2 + 6$ is wider than the graph of $y = x^2$ and it is shifted 6 units down from $y = x^2$.
B. The graph of $y = \frac{1}{6}x^2 + 6$ is wider than the graph of $y = x^2$ and it is shifted 6 units up $y = x^2$.
C. The graph of $y = \frac{1}{6}x^2 + 6$ is more narrow than the graph of $y = x^2$ and it is shifted 6 units up from $y = x^2$.
D. The graph of $y = \frac{1}{6}x^2 + 6$ is more narrow than the graph of $y = x^2$ and it is shifted 6 units down from $y = x^2$.  

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10. Evaluate $2\sqrt{x} + 3$ for $x = 6$.
   A 18
   B 12
   C 6
   D 3

11. Which of the following statements is true?
   A $2\sqrt{12} = 3\sqrt{9}$
   B $8\sqrt{25} = 5\sqrt{32}$
   C $6\sqrt{6} = 3\sqrt{8}$
   D $3\sqrt{4} = 2\sqrt{9}$

12. Brian is helping his dad stake a tree in their front yard. They are placing a wire around the tree trunk at a height of 6 feet and driving the stakes into the ground 3 feet from the base of the tree. How long must the wire be to the nearest tenth of a foot?
   A 5.2 feet
   B 6.7 feet
   C 9.0 feet
   D 18.0 feet

13. Which of the following is a graph of a quadratic function?
   A
   B
   C
   D
14. Which of the following graphs of the given equations would be symmetric about the y-axis?
   A  \( y = 4x \)  
   B  \( y = 2x^2 \)  
   C  \( y = x^2 \)  
   D  \( y = x + 2 \)

15. Which equation could be used to find the balance \( y \) in a bank account after \( x \) years? The initial deposit is $300 and the account pays 2% interest, compounded annually.
   A  \( y = 300 \cdot 0.02^x \)  
   B  \( y = 300 \cdot 1.02^x \)  
   C  \( y = 0.02 \cdot 300^x \)  
   D  \( y = 1.02 \cdot 300^x \)

16. \( (24x^6 - 3x^3 + 12x^2) \div 6x \)
   A  \( 4x^6 - \frac{1}{2}x^3 + 2x^2 \)  
   B  \( 4x^5 - \frac{1}{2}x^2 + 2x \)  
   C  \( 4x^5 - 2x^2 + 2x \)  
   D  \( 18x^5 - 3x^2 + 6x \)

17. Divide.
   \( (-7x^5 + 28x^3 - 14x^4 + 42x^2) \div (-7x^2) \)
   A  \( -x^3 - 2x^2 + 4x + 6 \)  
   B  \( x^3 + 2x^2 - 4x - 6 \)  
   C  \( -x^3 - 4x^2 + 2x + 6 \)  
   D  \( x^3 + 4x^2 - 2x - 6 \)

18. Divide.
   \( (x^3 + 125) \div (x + 5) \)
   A  \( x^2 + 25 \)  
   B  \( x^2 + 5x + 25 \)  
   C  \( x^2 - 5x + 25 \)  
   D  \( x^2 - x + 120 \)

19. What is the value of \( x \) when the range of the function is 4?
   A  \( -4 \)  
   B  \( -2 \)  
   C  \( 0 \)  
   D  \( 2 \)

20. Simplify the expression.
   \( \frac{6 - 2x}{x^2 + x - 12} \)
   A  \( \frac{1}{x + 4} \)  
   B  \( \frac{-2}{x + 4} \)  
   C  \( \frac{2(3 - x)}{(x + 4)(x - 3)} \)  
   D  \( \frac{2}{x + 2} \)

21. Simplify the expression.
   \( \frac{x^2 - 4}{x^2 - 4x + 4} \)
   A  \( \frac{x + 2}{x - 2} \)  
   B  \( \frac{1}{x - 1} \)  
   C  \( \frac{1}{4x} \)  
   D  \( \frac{x}{x + 4} \)

22. Solve for \( x \).
   \( x^2 - 64 = 0 \)
   A  \( 8 \)  
   B  \( \pm 8 \)  
   C  \( 32 \)  
   D  \( \pm 32 \)
23. Solve the equation for \( x \).
\[(x - 2)^2 = 16\]
A. \(-2\) or 6
B. 0 or 6
C. \(-2\)
D. 0 or 4

24. Solve \( 12x^2 + 17x + 6 = 0 \) for \( x \).
A. \( \frac{2}{3} \) and \( \frac{3}{4} \)
B. \( \frac{2}{3} \) and \( \frac{3}{4} \)
C. \( -\frac{1}{12} \) and \( -6 \)
D. \( \frac{1}{6} \) and \( -\frac{1}{3} \)

25. A population of bacteria was counted every hour for a period of eight hours. This data is represented on the following scatter plot.

Which function would best model this data?
A. exponential
B. quadratic
C. linear
D. square root

26. Which equation describes the function shown in the graph?

![Graph Image]
A. \( y = x^2 + 4 \)
B. \( y = x - 4 \)
C. \( y = -x^2 + 4 \)
D. \( y = x^2 - 4 \)

27. Which of the following could be the equation of the function graphed below?

![Graph Image]
A. \( y = \sqrt{x} + 3 \)
B. \( y = \sqrt{x} + 3 \)
C. \( y = \sqrt{x} - 3 \)
D. \( y = \sqrt{x} - 3 \)
28. Using the grid, determine the approximate area of the shaded region to the nearest whole square unit.

A 11 square units  
B 15 square units  
C 18 square units  
D 23 square units

29. How could you estimate the unshaded area on the grid?

A Add the area of the shaded circle and the unshaded circles.  
B Subtract the area of the unshaded circles from the area of the shaded circle.  
C Subtract the area of the shaded circle from the total area on the grid.  
D Add the area of the shaded circle and the unshaded circles, then subtract from the total area on the grid.

30. Which is the best estimate of the area of the shaded region on the grid?

A 24 square units  
B 28 square units  
C 33 square units  
D 38 square units

31. Sandra has a rectangular garden with dimensions 8 feet by 12 feet. If she needs a garden hose that is at least as long as the diagonal of the garden, which of the following is the shortest hose that Sandra can buy?

A 12 feet  
B 14 feet  
C 15 feet  
D 20 feet
32. Lenny has a garden shaped like a right triangle. One side of the garden is against a shed, as shown below.

33. In the triangle shown below, \( m \angle G = m \angle E \).

34. Find the midpoint of the line segment with endpoints at \((7, 1)\) and \((-5, 3)\).
   A \((-1, 2)\)
   B \((1, 2)\)
   C \((6, -1)\)
   D \((-6, 1)\)

35. What is the length of the line segment with endpoints \((4, -5)\) and \((-12, 7)\)?
   A \(10\)
   B \(\sqrt{58}\)
   C \(2\sqrt{17}\)
   D \(20\)

36. Find the length of a segment with endpoints \((-4, 7)\) and \((12, -6)\).
   A \(\sqrt{29}\)
   B \(\sqrt{65}\)
   C \(5\sqrt{17}\)
   D \(25\sqrt{17}\)

37. The mean score on an English test was 62. What will be the mean if the teacher adds five points to each student’s score?
   A \(57\)
   B \(62\)
   C \(67\)
   D \(74\)

38. The median of a set of data is 31. More data is collected and 29 and 84 are added to the set. How will this affect the median?
   A The median will increase.
   B The median will decrease.
   C There will be no median.
   D The median will remain the same.
39. The median of the numbers in the list below is 5.

\[3, 4, 4, 5, 5, 7, 8\]

An additional number, \(n\), is added to the list. What must be true about \(n\) if the median of the new list is also 5?

A \( n = 5 \)  
B \( n \geq 5 \)  
C \( n \leq 5 \)  
D \( n < 5 \)

40. A small paper bag contains ping-pong balls. Four of the balls are orange, 12 are yellow, and 24 are white. If you were to randomly select a ball from the bag, what would be the probability of choosing a yellow or orange ball?

A \(40\%\)  
B \(30\%\)  
C \(7 \over 10\)  
D \(3 \over 5\)

41. A bag contains 6 red marbles, 7 blue marbles, 8 green marbles, and 9 yellow marbles. What is the probability of not getting a red or a blue marble on one pick?

A \(13 \over 30\)  
B \(1 \over 2\)  
C \(17 \over 30\)  
D \(4 \over 5\)

42. A bag contains 12 marbles, one of which is white. If a marble is taken from the bag and then replaced, what is the probability that the white marble will be drawn twice in a row?

A \(0\)  
B \(1 \over 24\)  
C \(1 \over 144\)  
D \(1 \over 6\)

43. Cassandra has a bag of beads that she is using to make bracelets. She has 30 red beads, 15 blue beads, and 30 white beads. If she chooses a bead at random, what is the probability that the bead will be blue?

A \(0.15\)  
B \(1 \over 5\)  
C \(2 \over 5\)  
D \(0.75\)

44. The manager of a carnival booth gives away stuffed animals as prizes. The frequency table shows the types of prizes that he has left.

<table>
<thead>
<tr>
<th>Prizes</th>
<th>Tally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear</td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td></td>
</tr>
<tr>
<td>Dog</td>
<td></td>
</tr>
<tr>
<td>Rabbit</td>
<td></td>
</tr>
</tbody>
</table>

If the manager selects a prize at random, what is the probability that the next winner will receive a stuffed bear?

A \(1 \over 5\)  
B \(1 \over 4\)  
C \(1 \over 3\)  
D \(1 \over 2\)

45. The probability that a new lightbulb is defective is 0.05. If you purchase a pack of 2 lightbulbs, what is the probability that both are defective?

A \(0.0025\)  
B \(0.025\)  
C \(0.05\)  
D \(0.1\)
# Standards Progress Test 5 Report

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Items</th>
<th>Number Correct</th>
<th>Proficient? Yes or No</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematical Processes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.2 Write an equation symbolically to express a contextual problem.</td>
<td>1, 2, 3</td>
<td>✘</td>
<td>3</td>
<td>9-1, 9-2</td>
</tr>
<tr>
<td>SPI 3102.1.4 Translate between representations of functions that depict real-world situations.</td>
<td>4, 5, 6</td>
<td>✘</td>
<td>3</td>
<td>9-2, 9-7</td>
</tr>
<tr>
<td>SPI 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.</td>
<td>7, 8, 9</td>
<td>✘</td>
<td>3</td>
<td>9-1</td>
</tr>
<tr>
<td><strong>Number and Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.2.1 Operate (add, subtract, multiply, divide, simplify, powers) with radicals and radical expressions including radicands involving rational numbers and algebraic expressions.</td>
<td>10, 11, 12</td>
<td>✘</td>
<td>3</td>
<td>10-1, 10-2</td>
</tr>
<tr>
<td><strong>Algebra</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>13, 14, 15</td>
<td>✘</td>
<td>3</td>
<td>9-7</td>
</tr>
<tr>
<td>SPI 3102.3.2 Operate with polynomials and simplify results.</td>
<td>16, 17, 18</td>
<td>✘</td>
<td>3</td>
<td>11-3</td>
</tr>
<tr>
<td>SPI 3102.3.4 Operate with, evaluate, and simplify rational expressions including determining restrictions on the domain of the variables.</td>
<td>19, 20, 21</td>
<td>✘</td>
<td>3</td>
<td>11-1</td>
</tr>
<tr>
<td>SPI 3102.3.10 Find the solution of a quadratic equation and/or zeros of a quadratic function.</td>
<td>22, 23, 24</td>
<td>✘</td>
<td>3</td>
<td>9-3, 9-4</td>
</tr>
<tr>
<td>SPI 3102.3.11 Analyze nonlinear graphs including quadratic and exponential functions that model a contextual situation.</td>
<td>25, 26, 27</td>
<td>✘</td>
<td>3</td>
<td>9-1, 9-7, 10-5</td>
</tr>
<tr>
<td><strong>Geometry and Measurement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.4.1 Develop and apply strategies to estimate the area of any shape on a plane grid.</td>
<td>28, 29, 30</td>
<td>✘</td>
<td>3</td>
<td>TN-3</td>
</tr>
<tr>
<td>SPI 3102.4.2 Solve contextual problems using the Pythagorean Theorem.</td>
<td>31, 32, 33</td>
<td>✘</td>
<td>3</td>
<td>10-1</td>
</tr>
<tr>
<td>SPI 3102.4.3 Solve problems involving the distance between points or midpoint of a segment.</td>
<td>34, 35, 36</td>
<td>✘</td>
<td>3</td>
<td>Concept Byte, p. 605</td>
</tr>
</tbody>
</table>
State Performance Indicators | Test Items | Number Correct | Proficient? Yes or No | Algebra 1 Student Edition Lesson(s)  
--- | --- | --- | --- | ---  
**Data Analysis, Statistics, and Probability**  
SPI 3102.5.2 Identify the effect on mean, median, mode, and range when values in the data set are changed.  
| 37, 38, 39 | 3 |  | 12-3  
SPI 3102.5.5 Determine theoretical and/or experimental probability of an event and/or its complement including using relative frequency.  
| 40, 41, 42, 43, 44, 45 | 6 |  | 12-7, 12-8  

Student Comments:

________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
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Parent Comments:

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________________________________________________________________________

Teacher Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Write an expression for each phrase.

1. eight less than 12 times $x$

2. negative five times the quantity three plus $k$

Simplify each expression.

3. $-7.4 - 2.8$

4. $2 \frac{1}{2} + \left(-3 \frac{1}{8}\right)$

5. List all the subsets of $\{2, 3, 5, 8\}$.

6. Solve: $\frac{x}{6} = \frac{5}{8}$

7. You have a coupon for 10% off of a DVD that costs $15. If a tax of 8% is charged on the original amount, what will you pay for the DVD?

8. Use an equation to model the relationship shown in the table.

<table>
<thead>
<tr>
<th>Month</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$12</td>
</tr>
<tr>
<td>2</td>
<td>$24</td>
</tr>
<tr>
<td>3</td>
<td>$36</td>
</tr>
<tr>
<td>4</td>
<td>$48</td>
</tr>
</tbody>
</table>

9. Estimate $\sqrt{68}$ to the nearest integer.

10. Which property is illustrated?

$$ (4 \cdot -7) \cdot 5 = 4(-7 \cdot 5) $$

Solve each inequality. Check your answer.

11. $n - 9.4 \geq 15.6$

12. $-20 \leq -4x$

13. The formula for finding the area of a triangle is $A = \frac{1}{2}bh$.

A triangle has height 12 in. and area 54 in.$^2$. What is the length of its base?

14. Evaluate the expression $b^2 - 2c$ for $b = 6$ and $c = 2.5$.

15. Which property is illustrated?

$$ 6(3 + 1) = 6 \cdot 3 + 6 \cdot 1 $$

16. Write an equation to model this situation. Then use your equation to solve. Jack saved $16.50 to spend on amusement-ride tickets. Each ticket costs $0.75. How many tickets can Jack buy?
Quarter 1 Test (continued)  
Chapters 1–3

17. Tell whether \( x = 6 \) is a solution of the equation \( 2x^2 - (4x + 5) = 43 \).

18. Write an inequality for the graph.

19. There are 15 clowns in a circus. Each clown has to act either happy or sad. Twelve of the clowns have red noses. Each of the seven happy clowns has a red nose. Five of the sad clowns have red noses. How many clowns have to act sad and do not have a red nose?

20. \( 9k - 2 = 43 \)

21. \( 2(y + 5) = 16 \)

22. \( 5(h + 2) = -3(4 - h) \)

23. Simplify the expression.
\[
\frac{8 + 4(3)^2}{2^2 + 3}
\]

24. Schools often have a section of street called a school zone located near their entrances. In a school zone, driving speeds are reduced at certain times of the day. If a school zone is 0.3 mi long, how many minutes longer does it take to drive through it at 20 mi/h than at 30 mi/h?

25. A tree grows from 5 ft to 5.7 ft. What is the percent increase?

Solve each inequality. Check your answer.

26. \( 2y - 6 < 4(2 + y) \)

27. \( 8 + 6n \geq 2 \) or \( -10n \geq 50 \).

28. \( |x - 6| \geq 8 \)

29. Tell whether the ordered pair \((15, 6)\) is a solution of the equation \( y = \frac{4}{5}x - 6 \).

30. \( \triangle CAB \) is similar to \( \triangle EDF \). What is the length of \( DE \)?

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Quarter 2 Test

Chapters 4–6

Solve each system by graphing.

1. \( y = -x + 5 \)
   \( y = 2x - 4 \)

2. \( y > 5x + 1 \)
   \( y \leq -x + 3 \)

3. Solve the system using elimination.
   \( 6x - 18y = 60 \)
   \( 9x + 2y = 32 \)

Write a system of equations to model each situation. Solve by any method.

4. Lisa charges $25 for private tutoring and $18 for group tutoring. In one day, Lisa earned $265 from 12 students. How many students of each type did she tutor?

5. A collection of quarters and nickels is worth $1.25. There are 13 coins in all. How many of each coin are there?

6. A new animal species is introduced to an uninhabited island. The species has an abundant food source and its population thrives. Sketch a graph showing what the population of the species might look like over time.

7. Model the rule \( f(x) = \frac{1}{2}x - 3 \) with a table and a graph.

8. The table shows a school district’s enrollment for two successive years. Write a linear function using the data (with \( x \) representing the year number), and then use the model to predict the enrollment in Year 4.

<table>
<thead>
<tr>
<th>Year</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8295</td>
</tr>
<tr>
<td>2</td>
<td>8072</td>
</tr>
</tbody>
</table>

9. Write an equation in point-slope form for the line through the point \((2, -7)\) with slope \( m = \frac{1}{3} \).

10. What is the range of the function \( f(x) = x^2 + 1 \), when the domain is \( \{-6, 4, 8\}\)?

Write a function rule to describe each statement.

11. the amount of money you earn babysitting at $3.00 per hour

12. the amount of change \( c(x) \) from a $20 bill if you buy \( x \) pounds of pears for $0.79/lb.

Write the equation of direct variation that includes the given point.

13. \((-6, 5)\)

14. \((14, -28)\)
Quarter 2 Test  
(continued)  
Form G

Chapters 4–6

Find the next three terms of the arithmetic sequence.

15. 9, 12, 15, ...

16. 288, 252, 216, ...

Write each equation in slope-intercept form.

17. \(-8y = 5x + 3\)

18. \(6x = 4y - 12\)

Find the slope of the line passing through each pair of points.

19. (5, 2) and (7, 12)

20. (−1, 4) and (5, −5)

21. Find the x- and y-intercepts of the line \(3x + 2y = 12\).

22. Write an equation in slope-intercept form for the line with slope \(\frac{3}{5}\) and y-intercept −5.

23. Make a scatter plot of the data and describe the correlation.

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

24. Graph \(y = |x| - 2\) by translating \(y = |x|\).

25. Use the graph to find the slope and write the equation of the line.

26. Are the lines \(y = -\frac{4}{3}x + 3\) and \(4x + 3y = 1\) parallel, perpendicular, or neither?

27. Is (3, 10) a solution of \(y \geq 5x - 8\)? Explain why or why not.

28. Is the function shown by the table linear or nonlinear?

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

29. Write an equation for the line through (1, 3) and (4, 9) in standard form.

30. The parents club compiled a cookbook. One company charges $750 to make a master copy and $25 for each additional copy. The total selling price depends on how many copies are ordered. Write a function rule and create a table of values to graph the rule. How much will you save per book by ordering 400 books instead of 100 books?
Quarter 3 Test
Chapters 7–9

**Simplify each expression. Use positive exponent.**

1. \( \frac{a^5b^{-3}}{a^2} \)

2. \( 4y^3 \cdot 7x^2 \cdot 9y^9 \)

3. \( (x^2)^3(6x^2y^{-3})^2 \)

4. Write 3,463,000,000 in scientific notation.

5. Write the following in order from least to greatest. \( 4.72 \times 10^3, 42.7 \times 10^2, 472, 0.0427 \times 10^7 \).

6. Evaluate \( y = 3 \cdot 2^x \) for \( x = 1, 2, \) and \( 3 \).

7. Use a table to graph the function \( y = 3 \cdot 4^x \) with domain \(-2, -1, 0, 1, 2\).

**Solve each equation. If necessary, round to the nearest hundredth.**

8. \( 4x^2 - 5 = 7x \)

9. \( 4x^2 = 100 \)

10. Write an equation that models the data shown. Identify the data as linear, quadratic, or exponential.

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>3</td>
<td>12</td>
<td>27</td>
<td>48</td>
<td>75</td>
</tr>
</tbody>
</table>

Solve.

11. A square picture frame occupies an area of 112 ft\(^2\). What is the length of each side of the picture in simplified radical form?

12. Factor the expression on the left side of the equation by grouping. Then solve.

\( x^3 + 4x^2 - x - 4 = 0 \)

13. What term do you need to add to each side of \( 2x^2 - 8x = 9 \) to complete the square?

14. What is the vertex of the equation \( y = x^2 - 4x - 3 \)?

15. Find the number of real solutions of the equation \( 3x^2 - 5x + 4 = 0 \).
Quarter 3 Test (continued) Form G
Chapters 7–9

Simplify. Write each answer in standard form.

16. \((4x^3 + 3x^2 - 5x) - (x^3 - 11x^2 + 8)\)

17. \((5x^4 - 3x^3 + 6x) + (3x^3 - 11x^2 - 8x)\)

Simplify each product. Write in standard form.

18. \(3x(4x^4 - 5x)\)

19. \((x - 5)(x + 6)\)

Factor each expression.

20. \(x^2 + 5x - 6\)

21. \(x^2 - 625\)

22. \(8x^8 - 4x^4 + 12x^2\)

23. \(4x^2 - 16x - 84\)

24. \(2x^2 + 5x - 8x - 20\)

25. What would the value of \(n\) be, when \((x - n)^2\) are the factors of \(x^2 - 12x + 36\)?

26. Graph the function \(y = -x^2 - 2x + 1\).

27. A construction worker drops a tool from the top of a building that is 300 feet high. The height of the tool above ground can be modeled by \(h = -16t^2 + 300\), where \(h\) is height in feet and \(t\) is time in seconds.
   a. Use a table to graph this function.
   b. Use your graph to estimate the amount of time it takes for the tool to hit the ground. Round to the nearest tenth of a second.

28. The equation \(y = a \cdot b^x\) models both exponential growth and exponential decay. If \(a > 0\), describe the requirements for \(b\) for exponential growth, and describe the requirements for \(b\) for exponential decay.

29. Solve the system of equations.
   \[
   \begin{align*}
   y &= x^2 - 6x - 8 \\
   y + 7x &= 4
   \end{align*}
   \]

30. Evaluate \(r^{-5}s^3\) for \(r = -2\) and \(s = 3\).
Quarter 4 Test

Chapters 10–12

1. Looking at the spinner, which is the probability of spinning a number divisible by 4?

2. A football coach needs 12 players to ride on a float in a parade. He randomly selects names from a helmet. The helmet contains the names of 4 freshman, 13 sophomores, 14 juniors and 8 seniors. What is the probability the first two names chosen are juniors?

3. You remember recording bowling scores of 116, 105, 109, and 113; however, you cannot remember your score in the fifth game. You know your bowling average is 109, what did you score the fifth game?

4. Graph \( y = \sqrt{x} - 4 \).

5. Find the difference.
\[
\begin{bmatrix}
-4 & 2 \\
3 & 8
\end{bmatrix}
- \begin{bmatrix}
-2 & 1 \\
6 & -5
\end{bmatrix}
\]

6. Find the mean, median, and mode of the following data.
5 9 28 17 13 12 2 10 15 5 16

7. Simplify \( \frac{2a^2 + 20a + 50}{4a^2 - 100} \).

8. While studying gases, a chemist collects the data shown in the table below. Based on the data, is the variation between the pressure and the volume of a gas direct or inverse? Explain your reasoning.

<table>
<thead>
<tr>
<th>V</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>0.5</td>
</tr>
</tbody>
</table>

9. What are the minimum, first quartile, median, third quartile, and maximum of the data set below?
65 97 76 88 73 84 92 79 80 85 70 68

10. Would the histogram made from the following data appear uniform, symmetric, or skewed?

<table>
<thead>
<tr>
<th>Points scored in a game:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

11. A survey asks, “Do you like Candidate A more than Candidate B because of his policies on crime or because of his policies on the economy?” and reports that 100% of the people surveyed prefer Candidate A over Candidate B. Identify the source of bias in the survey.

12. One leg of a right triangle is 12. The hypotenuse equals 15. What is the length of the unknown leg?

13. \( \frac{5}{\sqrt{11} + \sqrt{7}} \)

14. \( 3\sqrt{4x^2} \cdot \sqrt{12x} \)
Quarter 4 Test (continued)  Form G

Chapters 10–12

Solve each radical equation.

15. \(10 - 4\sqrt{y} = 5\)

16. \(x = \sqrt{4x - 3}\)

17. Identify the asymptote(s) of the function. Then graph the function, \(y = \frac{4}{x - 3}\).

18. Writing Explain how to graph \(y = \sqrt{x} + 2\) by translating the graph of \(y = \sqrt{x}\).

Divide.

19. \(\frac{x^2 - 2x - 15}{x^2} ÷ \frac{x^2 - 4x - 5}{x}\)

20. \((3x^3 - 5x^2 - x + 3) ÷ (x - 1)\)

Add or subtract.

21. \(\frac{x}{x + 2} + \frac{4 + 2x}{x^2 - 4}\)

22. \(\frac{y}{y^2 - y - 20} - \frac{2}{y + 4}\)

Solve each equation.

23. \(\frac{x - 8}{3} + \frac{x - 3}{2} = 0\)

24. \(\frac{x^2}{x - 3} = \frac{9}{x - 3}\)

Simplify each expression.

25. \(5C_3\)

26. \(8P_5\)

27. A landscaper has 15 different shrubs to choose from to complete a landscape job. In how many ways can the landscaper choose 8 different shrubs? Assume that the shrubs can be arranged in any order.

Solve.

28. A robin flying over flat terrain sees a worm on the ground, at a sightline-distance of 140 ft. The angle of depression is 39°. How high above the ground is the robin?

29. Simplify \((8\sqrt{3} - \sqrt{5})(\sqrt{3} + 6\sqrt{5})\).

30. For triangle \(LMN\) below, write the equations for \(\sin L\) and for \(\tan M\).
Mid-Course Test  
Chapters 1–6

Simplify each expression.
1. $22[5^2 \div (4^2 + 3^2) + 9]$

2. $-2 \frac{1}{3} - \frac{5}{6}$

3. $(-6)^3(-3)$

4. Solve the proportion. $\frac{16}{9} = \frac{42}{x}$

5. The ratio of the number of right-handed students in school to the number of left-handed students in school is 9 : 1. There are 360 right-handed students in school. How many left-handed students are in school?

Evaluate the algebraic expression when $a = 3$, $b = 4.9$, and $c = -5$.

6. $a^2 - b$

7. $c^2 + 4ab$

Solve each equation or inequality.
8. $3x + 9 = 24$

9. $8(x - 5) = -40$

10. $\frac{5}{6}y - 5 \geq 30$

11. $-5 < 2d - 1 < 3$

12. Graph the real number solutions of $2x + 4 \geq 16$.

13. Solve and graph the inequality $|x + 3| \geq 7$.

14. Write a function rule to describe the amount of change $c(x)$ from a $20 bill if you buy $x$ pounds of grapes at $1.29 per pound.

15. What is the range of $y = x^2 - 5$ when the domain is $\{-1, 0, 3.5\}$?

16. Find the sixth term in the sequence $8, -2, -12, -22, \ldots$.

17. Is $(6, 3)$ a solution of $2y - 9 \geq 4(x - 8)$? Explain why or why not.

18. Tell whether the following system has one solution, infinitely many solutions, or no solution.

\[ \frac{x}{4} + \frac{y}{9} = 27 \]

\[ 3x \quad \frac{2y}{3} = 19 \]
Write an equation or inequality to model each situation. Then solve.

19. Mike withdrew $32 from his bank account at an ATM machine. The transaction slip said his balance was $289.14. What was his previous balance?

20. After you put 8 gallons of gas into an empty tank, the gas gauge reads $\frac{2}{3}$ full. What is the capacity of the tank?

21. The perimeter for the rectangle and regular hexagon below are equal. Find x.

22. Fair tickets for 2 adults and 3 children cost $34. An adult ticket costs $2 more than a child ticket. What is the price of an adult ticket?

23. What is the greatest number of $0.25 gumballs you can buy with $2.20?

Solve.

24. 12 is what percent of 37.5?

25. 82% of 350 is what number?

26. A package delivery company handles 14 million packages per year in the Midwest. If this represents only 35% of their total business how many total packages do they handle in a year?

Find the slope of the line passing through each pair of points.

27. $(-3, 4)$ and $(6, 1)$

28. $(4, 16)$ and $(0, 8)$

Write the equation of the line for each of the following conditions.

29. through two points $(2, 4)$ and $(4, 7)$

30. a horizontal line passing through the point $(6, 18)$

31. parallel to the line $y = \frac{4}{9}x + 5$ through point $(-2, 1)$

32. Write the equation of direct variation that includes the point $(-6, 2)$.

Write an expression for each phrase.

33. the quantity two times $d$ minus five times the quantity six times $d$ plus four

34. fifteen less than six times the square of $x$

35. Graph the function $y = |x| - 4$, by translating $y = |x|$.
36. Write an equation which translates \( y = \| x \| \) 6 units to the left.

Solve.

37. Using the formula \( C = \frac{5}{9}(F - 32) \), find the Fahrenheit temperature when the Celsius temperature is 45°.

38. Mr. Smith expects to pay $19,400 in taxes. This is no more than \( \frac{1}{3} \) of his salary. What is his least possible earned income?

39. Which property is illustrated?
\[ 6(12 - 3) = 6(12) - 6(3) \]

40. Which employee has the highest hourly rate? Keep in mind that they do not get paid for lunch.

<table>
<thead>
<tr>
<th></th>
<th>Total Hours Worked</th>
<th>Lunch Hour</th>
<th>Pay Before Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott</td>
<td>42.5</td>
<td>3.5</td>
<td>$645.60</td>
</tr>
<tr>
<td>Mike</td>
<td>38.75</td>
<td>2.75</td>
<td>$629.70</td>
</tr>
<tr>
<td>Todd</td>
<td>40.5</td>
<td>3.25</td>
<td>$641.25</td>
</tr>
<tr>
<td>Jason</td>
<td>41.25</td>
<td>4.0</td>
<td>$647.50</td>
</tr>
</tbody>
</table>

41. Solve the following system.
\[
\begin{align*}
3x + 2y &= 18 \\
y &= \frac{2}{3}x + 12
\end{align*}
\]

42. Given \( A = \{1, 2, 3, 4, 5\} \) and \( B = \{2, 4, 6, 8, 10\} \), what is \( A \cap B \)?

43. Luis leaves home riding his bike. The graph below relates two quantities—distance from home and time in minutes—of Luis’s trip. Use the graph to write your own summary of Luis’s trip. Be sure to include descriptions of Luis’s relative speed during different intervals of the trip, as modeled by the graph.

44. What is the solution of \( | -2x + 5 | < 60 \)?
45. Joe started a new job in 2001. His salary was $32,600. At the beginning of the next year he will receive a raise of $1560. Assume he will receive the same raise every year.

46. A boy 4 ft tall casts a shadow 6 ft long. He stands next to a monument that has a 52 ft long shadow. How tall is the monument?

47. You start a pet-sitting service. You spend $35 on advertising. You plan to charge $5 a day to watch each pet.
   a. Write an equation to relate your daily income $y$ to the number of pets $x$ you watch.
   b. Graph the equation. What are the $x$- and $y$-intercepts?
   c. How many days do you need to watch a pet to pay for advertising?

48. Write a function rule for the table of values.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-1$</td>
<td>$-3.5$</td>
</tr>
<tr>
<td>$0$</td>
<td>$0$</td>
</tr>
<tr>
<td>$1$</td>
<td>$3.5$</td>
</tr>
<tr>
<td>$2$</td>
<td>$7$</td>
</tr>
</tbody>
</table>

49. Suppose you receive an E-Mail file that contains an image that is 25% larger than the original image. By what percent decrease would you need to reduce the image size to return it to its original size?

50. Describe how you can tell whether two lines are parallel, perpendicular, or neither without graphing them.
1. Place the following in order from greatest to least.
   \[0.6, \frac{2}{3}, -\frac{1}{2}, (-0.3)^2\]

2. What is the equation of the graph shown?

3. Gina has an appointment in 45 min. She is driving at a rate of 30 mi/h. If the appointment is 24 mi away, will she arrive on time? If not, how early or late will she be?

4. The library fine for an overdue DVD is $2 for the first day plus $0.25 for each additional day. How many days overdue is a DVD if the fine is $3.25?

5. \[
\begin{bmatrix}
-1 & 2 \\
4 & 3 \\
\end{bmatrix}
- \begin{bmatrix}
3 & 2 \\
1 & 0 \\
\end{bmatrix}
\]

6. \[-8x(x - 3)\]

7. \[(6x^3 + 2x^2 - 5x) - (x^3 - 9x^2 + 4)\]

Solve.

8. \[4x - 11 = 7\]

9. \[\frac{8}{x + 3} = \frac{1}{x + 1}\]

10. \[\sqrt{7x - 1} = \sqrt{5x + 3}\]

11. \[|x - 8| = 5\]

12. \[6x^2 + 7x - 20 = 0\]

Write in standard form the equation of a line that satisfies the given conditions.

13. perpendicular to \(9x + 3y = 36\), through \((1, 2)\)

14. \(x\)-intercept = 5 and \(y\)-intercept = -4
Final Test (continued)  
Chapters 1–12

Evaluate.
15. \(f(3)\) when \(f(x) = 4x - 7\)
16. \(f(3)\) when \(f(x) = 2^x - 1\)

Factor.
17. \(x^2 + 6x - 27\)
18. \(2x^3 + x^2 - 14x - 7\)
19. Find the number of real number solutions of \(4x^2 + 16x + 15 = 0\).
20. Find the 6th term in the sequence 
\(-5, -9, -13, -17, \ldots\)

Simplify each radical expression.
21. \(\sqrt{75} + \sqrt{3}\)
22. \(\sqrt{75x^2} \cdot \sqrt{3x^3}\)

Simplify each expression.
23. \(5^2 - (2 + 3 \cdot 4)\)
24. \(7x^2y^{-1}(2xy^2)^3\)
25. \(\frac{4x^2y^5}{12x^3y^2z^{-3}}\)
26. What is the probability of rolling a number divisible by 2 on a number cube?

27. At a horse show, ribbons are given for first, second, third, and fourth places. There are 20 horses in the show. How many different arrangements of four winning horses are possible?
28. Solve and graph the inequality.
\[-3 \leq -(x + 9)\]
Final Test (continued)

Chapters 1–12

Find each product. Write each answer in standard form.

29. \((x^2 + 4)(x + 3)\)

30. \((3x - 4)(3x + 5)\)

Solve.

31. Suppose the function \(y = 25,000(1.06)^x\) models the annual starting salary for a small business \(x\) years after 2000.
   a. Find the starting salary in 2002.
   b. Find the starting salary in 2007.

32. Write 375,000 in scientific notation.

33. Write an inequality that describes the graph.

Solve each system using any method.

34. \(7x + 15y = 32\)
   \[x = 3y + 20\]

35. \(y = \frac{1}{2}x - 1\)
   \[y = -x + 3\]

36. Write a system of equations to model this situation. Then use your system to solve. At a garage sale a CD costs three times as much as a book. You bought three books and 2 CDs. You spent $18. What is the price of a CD and the price of a book?

37. 88 is 22% of what number?

38. Jennifer is planning to buy a car. The car costs $14,500. She lives in Iowa where the sales tax is 7.2%. What is the total cost for the car?

39. The students in the band are selling entertainment books. They earn $11.25 on each book they sell. Their goal is to earn more than $7000. What is the fewest number they can sell and still reach their goal?

40. Find the mean, median, and mode of the following test scores.
   \[89, 92, 93, 89, 90\]
Write an equation or inequality. Then solve.

41. The sum of three consecutive integers is 219. Find the integers.

42. The Local Phone Company charges a monthly fee of $26.99 plus $0.07 for each minute of long distance up to 2000 minutes. Find the maximum and minimum number of minutes of long distance charges for customers whose monthly charge is at least $53.24 but no more than $132.00.

43. The sides of a triangular garden are 10 ft, 22 ft, and 18 ft. Is the garden in the shape of a right triangle? Justify your answer.

44. Multiply.
\[
\frac{x + 2}{3x + 3} \cdot \frac{6x^2 - 6}{x^2 + 5x + 6}
\]

45. Divide.
\[
\frac{4x^4 - 9x^3 - 11 + x + 2x^2 + 6x^5}{2x^2 - 3}
\]

46. Suppose \(y\) varies directly with \(x\). Write an equation for the direct variation if \(y = 8\) when \(x = 15\).

47. Suppose \(y\) varies inversely with \(x\). Write an equation for the inverse variation if \(y = 8\) when \(x = 15\).

48. The equation for the gravitational force between two objects is given below. Solve the equation for \(r\).
\[
F_g = G \frac{m_1 m_2}{r^2}
\]

49. Suppose \(U = \{10, 20, 30, 40, 50\}\) is the universal set and \(A = \{10, 20, 50\}\). What is \(A'\)?

50. Use a table to graph the function \(y = 2x^2 - 5\). Estimate the value of the \(x\)-intercepts.
Quarter 1 Test

Write an expression for each phrase.
1. two less than three times $n$
2. six times the total of 2 plus $x$

Simplify each expression.
3. $7 - 4$
4. $\frac{1}{4} + \frac{1}{2}$

5. List all the subsets of \{2, 10\}.
6. Solve: $\frac{n}{2} = \frac{3}{7}$

7. You have a coupon for 10% off a lamp that costs $60. What is the discounted price of the lamp?

8. Use an equation to model the relationship shown in the table.

<table>
<thead>
<tr>
<th>Day</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 in.</td>
</tr>
<tr>
<td>2</td>
<td>4 in.</td>
</tr>
<tr>
<td>3</td>
<td>6 in.</td>
</tr>
<tr>
<td>4</td>
<td>8 in.</td>
</tr>
</tbody>
</table>

9. Estimate $\sqrt{17}$ to the nearest integer.

10. Which property is illustrated?
    $(4 \cdot 8) \cdot 6 = 4 \cdot (8 \cdot 6)$

Solve each inequality. Check your answer.
11. $x - 7 < 35$
12. $-60 \leq 6x$

13. The formula for finding the area of a rectangle is $A = lw$.
    A rectangle has length 10 in. and area 20 in.$^2$. How wide is the rectangle?

14. Evaluate the expression $a + 2b$ for $a = 6$, and $b = 2$.

15. Which property is illustrated?
    $4(5 - 2) = 4 \cdot 5 - 4 \cdot 2$

16. Write an equation to model this situation, and then use your equation to solve it.
    A teacher has 72 pencils to hand out to 24 students. How many pencils does each student receive?
Quarter 1 Test (continued)  

Chapters 1–3

17. Tell whether \( x = 4 \) is a solution of the equation \( 6x - 4 = 20 \).

18. Write an inequality for the graph.

[Graph showing a number line with points at -5, -4, -3, -2, -1, 0, 1, 2 marked.]

19. There are 15 dogs at a park. Ten of the dogs are small. Five of the dogs are large and have short tails. In all, eight dogs have short tails. How many dogs are small and have long tails?

Solve each equation. Check your answer.

20. \( 9w - 5 = 22 \)

21. \( 2(t + 4) = 10 \)

22. \( 2x + 2 = 3 + x \)

23. Simplify the expression.
   \[
   \frac{8 + 3(4)}{30 - 3}
   \]

24. How many miles will you travel in 2 h at 15 mi/h?

25. A shirt is on sale for $9 reduced from $12. What is the percent decrease of the cost of the shirt?

Solve each inequality. Check your answer.

26. \( 2s - 6 \geq 4 \)

27. \( 8 + n \geq 2 \) or \( -5n \geq 50 \)

28. \( |r - 3| < 6 \)

29. Tell whether the ordered pair (3, 6) is a solution of the equation \( y = 4x - 8 \).

30. \( \triangle CAB \) is similar to \( \triangle EFD \). What is the length of \( DE \)?

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### Quarter 2 Test

**Chapters 4–6**

Solve each system by graphing.

1. \[
\begin{align*}
  y &= x + 1 \\
  y &= -x + 3
\end{align*}
\]

2. \[
\begin{align*}
  y &< 2x - 1 \\
  y &\geq -x + 2
\end{align*}
\]

3. Solve the system using elimination.
   \[
   \begin{align*}
   x + 3y &= 13 \\
   3x - y &= -11
   \end{align*}
   \]

Write a system of equations to model each situation. Solve by any method.

4. You and some friends buy hamburgers and milkshakes for lunch. A hamburger costs $1.50 and a milkshake costs $2.00. The total bill for 12 items is $21.50. How many hamburgers and how many milkshakes did your group buy?

5. A collection of dimes and nickels is worth $0.55. There are 7 coins in all. How many dimes and how many nickels are there?

6. Suppose you plant a tree in fertile soil and provide the proper amount of water and fertilizer. The tree is healthy and grows steadily.

7. Sketch a graph showing what the height of the tree might look like over time.

8. The table shows a hospital's patient count for two successive days. Write a linear function using the data (with \(x\) representing the day number), and then use the model to predict the patient count on Day 3.

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>295</td>
<td>272</td>
</tr>
</tbody>
</table>

9. Write an equation in point-slope form for the line through the point \((1, -4)\) with slope \(m = -3\).

10. What is the range of \(f(x) = 3x - 5\) when the domain is \([-6, 4, 8]\)?

Write a function rule to describe each statement.

11. The amount of money you earn mowing lawns at $20 per lawn

12. The amount of medicine \(m(x)\) left in an 8 oz bottle after \(x\) doses of 0.25 oz each

Write the equation of direct variation that includes the given point.

13. \((6, 5)\)

14. \((4, -8)\)

Find the common difference in each arithmetic sequence. Then find the next two terms.

15. \(-7, -4, -1, 2, \ldots\)

16. \(21, 33, 45, 57, \ldots\)
Quarter 2 Test (continued)  
Chapters 4–6

Write each equation in slope-intercept form.

17. \( 2y = 4x + 6 \)
18. \( 10x = 5y - 20 \)

Find the slope of the line passing through each pair of points.

19. \((2, 2)\) and \((6, 10)\)
20. \((-2, 6)\) and \((1, 3)\)

21. Find the \(x\)- and \(y\)-intercepts of the line \(x + y = 3\).

22. Write an equation in slope-intercept form for the line with slope \(\frac{-2}{5}\) and \(y\)-intercept \(-4\).

23. Graph \(y = |x + 2|\) by translating \(y = |x|\).

24. Make a scatter plot of the data and describe the correlation.

| \(x\) | 2 | 6 | 5 | 4 | 3 | 5 |
| \(y\) | 7 | 4 | 4 | 3 | 5 | 5 |

25. Use the graph to find the slope and write the equation of the line.

26. Are the lines \(y = -\frac{1}{2}x\) and \(y = 2x\) parallel, perpendicular, or neither?

27. Determine whether \((2, 8)\) is a solution of \(y \geq 2x + 3\). Explain why or why not.

28. Is the function shown by the table linear or nonlinear?

| \(x\) | 0 | 1 | 2 | 3 | 4 |
| \(y\) | 0 | 1 | 4 | 9 | |  

29. Write an equation for the line through \((0, 0)\) and \((2, 2)\) in standard form.

30. A high school has designed the yearbook. A company charges $900 to assemble the master copy and $42 to make each additional copies. The total selling price depends on how many copies are made. Write a function rule and make a table of values to construct a graph. How much will the school save on each book by ordering 600 instead of 200?
Quarter 3 Test
Chapters 7–9

Simplify each expression. Use positive exponents.

1. \( \frac{x^3y^{-2}}{x} \)

2. \( 2x^3 \cdot 3x^2 \cdot 2y \)

3. \( (2x^2y^3)^2 \)

4. Write 7,402,000 in scientific notation.

5. Write the following in order from least to greatest. \( 23.6 \times 10^3, 2.36 \times 10^2, 2.36 \times 10^3 \)

6. Evaluate \( y = 3 \cdot 2^x \) for \( x = 0, 1, \) and 2.

7. Use a table to graph the function \( y = \frac{1}{2} \cdot (2^x) \) with domain \( \{-2, -1, 0, 1, 2\} \).

8. Solve each equation. If necessary, round your answer to the nearest hundredth.

9. \( x^2 = 16 \)

10. Write an equation that models the data shown. Identify the data as linear, quadratic, or exponential.

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>0.5</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

11. A square garden has an area of 75 ft\(^2\). What is the length of each side of the plot in simplified radical form?

12. Factor the expression on the left side of the equation by grouping. Then solve.

\( x^2 - 2x + 3x - 6 = 0 \)

13. What term do you need to add to each side of \( x^2 + 6x = -15 \) to complete the square?

14. What is the vertex of the equation \( y = x^2 - 6x + 4 \)?

15. Find the number of real solutions of the equation \( y = 5x^2 + 10x + 3 \).

16. \( (x^2 - 10x + 5) + (9x^2 - 10x - 3) \)

17. \( (x^2 - 4x + 5) - (3x^2 + 7x + 3) \)
Quarter 3 Test (continued)  
Chapters 7–9

Simplify each product. Write in standard form.

18. $4x(6x^3 - 10x)$

19. $(x + 4)(x + 6)$

Factor each expression.

20. $x^2 + 12x + 11$

21. $x^2 - 121$

22. $3x^4 + 12x^2 + 6x$

23. $3x^2 - 6x - 24$

24. $2x^2 - 14x + 3x - 21$

25. What is the value of $n$ when $(x + n)^2$ are the factors of $x^2 + 8x + 16$?

26. Graph the function $y = 3x^2 - 2$.

27. A stone falls from a cliff that is 500 feet high. The height of the stone above ground can be modeled by $h = -16t^2 + 500$, where $h$ is height in feet and $t$ is time in seconds.
   a. Use a table to graph this function.
   b. Use your graph to estimate the amount of time it takes for the stone to hit the ground. Round your answer to the nearest tenth of a second.

28. Does the equation $y = a \cdot b^x$ model exponential growth or exponential decay when $a > 0$ and $0 < b < 1$?

29. Solve the system of equations.
   \[
   \begin{align*}
   y &= x^2 \\
   y &= -3x - 2
   \end{align*}
   \]

30. Evaluate $x^{-2}y^3$ for $x = -2$ and $y = -4$. 
Quarter 4 Test

Chapters 10–12

1. Refer to the spinner below. What is the probability of landing on a green space?

```
blue  green  green  blue  red  green  blue
```

2. The school yearbook staff needs two people to take pictures at a local parade. The names of two freshmen, three sophomores, and three juniors are placed in a hat. What is the probability that the two chosen names are freshmen?

3. Your test average is 86 after taking three tests. You remember that two of your scores were 88 and 83. What was your score on the third test?

4. Graph \( y = \sqrt{x - 3} \).

```
<table>
<thead>
<tr>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

5. Find the difference.

\[
\begin{bmatrix}
-2 & 3 \\
4 & 5
\end{bmatrix} - \begin{bmatrix}
-2 & 5 \\
0 & -4
\end{bmatrix}
\]

6. Find the mean, median, and mode of the following data.

5  6  6  6  10  11  12  12  13

7. Simplify \( \frac{2a + 20}{4a + 40} \).

8. You record the following data from the annual Park Cleanup Day. Based on the data, is there a direct variation or an inverse variation? Explain your reasoning.

<table>
<thead>
<tr>
<th>Volunteers</th>
<th>5</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>12</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

9. What are the minimum, first quartile, median, third quartile, and maximum of the data set below?

70  73  79  80  84  85  92

10. Would a histogram made from the data below appear uniform, symmetric, or skewed?

shots blocked in each of the last 12 games:

0  0  0  1  4  5  5  7  7  9  9  15

11. You want to find the percent of people in your neighborhood who are in favor of a new toll road being built nearby. You ask all homeowners who live closest to the toll road. How might this create bias in your survey results?

12. The legs of a right triangle are 3 and 4. What is the hypotenuse?

13. Simplify each radical expression.

\[
\frac{1}{\sqrt{5} + \sqrt{3}}
\]

14. \(2\sqrt{n^2} \cdot \sqrt{8n}\)
Solve each radical equation.

15. \(2 + 2\sqrt{x} = 3\)

16. \(x = \sqrt{7x - 6}\)

17. Identify the asymptote(s) of the function.

Then graph the function \(y = \frac{2}{x - 1} + 3\).

18. Writing Explain how to graph \(y = \sqrt{x} - 3\) by translating the graph of \(y = \sqrt{x}\).

Divide.

19. \(\frac{x}{8 - 2x} \div \frac{2x}{4 - x}\)

20. \((x^3 + 4x^2 + 8x + 5) \div (x + 1)\)

Add or subtract.

21. \(\frac{x}{x + 3} + \frac{2}{x^2 - 9}\)

22. \(\frac{n + 5}{n - 4} - \frac{n}{n^2 - 6n + 8}\)

Solve each equation.

23. \(\frac{1}{4} + \frac{4}{x} = \frac{1}{x}\)

24. \(\frac{x^2}{x - 2} = \frac{4}{x - 2}\)

Simplify each expression.

25. \(\binom{5}{2}\)

26. \(\binom{5}{3}\)

27. Six students are trying out for 2 different roles in a school play. In how many ways can the 2 roles be filled?

Solve.

28. The string of a kite is 100 ft long and is held against a flat area of ground, where it makes an angle of 40\(^\circ\) with the ground. How high is the kite? Round your answer to the nearest tenth.

29. Simplify \((4\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2})\).

30. Find \(\sin A\) and \(\tan B\) of triangle \(ABC\) below.

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Simplify each expression.
1. \[10 \div (3 + 2) + 9\]
2. \[\frac{1}{4} + \frac{1}{2}\]
3. \[2^2(-3)\]
4. Solve the proportion. \[\frac{x}{3} = \frac{12}{9}\]

5. A pet store has 3 dogs for every 2 cats. If there are 15 dogs at the store, how many cats are there?

Evaluate each expression for \(a = 8\), \(b = 5\), and \(c = -2\).
6. \(a - b^2\)
7. \(b(a + c)\)

Solve each equation or inequality. Then check.
8. \[3x + 1 = 13\]
9. \[2(y + 1) = 6\]
10. \[3y + 2 > 8\]
11. \[2 < x + 1 < 5\]

Solve and graph each inequality.
12. \(4x - 5 < 19\)
13. \(-7x \leq 35\)

14. Write an inequality for the graph.

15. Write a function rule to describe the cost of \(x\) pounds of apples that cost $1.39 per pound.

16. Find the next two terms in the arithmetic sequence. 76, 89, 102, 115, . . .

17. Is (6, 3) a solution of \(2y \geq x - 8\)? Explain why or why not.

18. Tell whether the following system has one solution, infinitely many solutions, or no solution.
\[x + y = 8\]
\[2x + 2y = 16\]
Solve each problem.

19. Jason has a $100 gift card. After he makes a $39 purchase, how much money remains on the gift card?

20. You can fill the gas tank of a lawn mower 4 times from a single gallon of gas. What is the capacity of the gas tank?

21. Tickets to the zoo for one adult and two children cost $17. An adult ticket costs $2 more than a child ticket. What is the price of an adult ticket?

22. Write an inequality to find the greatest number of $0.50 tickets you can buy with $5.25.

23. Write and simplify an expression for the perimeter of the figure shown. If the perimeter is 22, find \(x\).

24. What is 25% of 80?

25. 85% of 300 is what number?

26. In a survey 650 out of 1200 people change the oil in their car every 3000 miles. What percent of the people change their oil every 3000 miles?

27. Find the slope of the line.

28. Find the slope of the line passing through the points (1, 4) and (3, 16).

29. Write the equation of the line passing through the points (0, 0) and (1, 2).

30. Write the equation of the vertical line passing through the point (5, 3).

31. What is the slope of a line that is parallel to the line \(y = 5x + 3\)?

32. Write the equation of a direct variation that includes the given point (3, 9).
Mid-Course Test (continued)  
Chapters 1–6

**Write an expression for each phrase.**

33. six more than 6 times a number

34. four times the quantity $x$ plus 3

35. Use the slope and $y$-intercept to graph the equation $y = 3x - 1$.

36. Does the equation $y = |x| + 3$ translate $y = |x|$ 3 units up or 3 units down? Use the point (0, 0) to explain your answer.

37. What is the width of a rectangle with area 30 ft$^2$ and length 5 ft?

38. Tips make up no more than $\frac{1}{4}$ of Jen’s income. If Jen earned $240 in total income for one week, what was the maximum amount she received in tips?

39. Which property is illustrated?

$$2(3 - 1) = 2(3) - 2(1)$$

40. While shopping, you find that a 12-oz package of Brand A costs $2.40 and a 16-oz package of Brand B costs $2.50. Which brand has a lower unit cost?

41. Solve the following system.

$$3x + y = 18$$
$$y = 12$$
Mid-Course Test (continued)  
Chapters 1–6

42. Given \( A = \{1, 2, 3\} \) and \( B = \{4, 6, 8\} \), what is \( A \cup B \)?

43. On a graph that relates distance with time, what does a horizontal line tell you about the speed of the object modeled by the graph?

44. What is the solution of \( |x| + 4 < 8 \)?

45. Dwayne received a $50 bonus at work last month. His company announced that the bonuses would be increased by $5 each month. Write a function rule representing Dwayne’s bonus plan after \( x \) months.

46. The two triangles shown are similar. What is the length of \( x \)?

47. Suppose you advertise your babysitting services at an hourly rate of $6 plus $2 for each child. Write an equation relating your total hourly rate \( y \) to the number of children \( x \) that you watch.

48. Use an equation to model the relationship in the table.

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$3</td>
</tr>
<tr>
<td>2</td>
<td>$6</td>
</tr>
<tr>
<td>3</td>
<td>$9</td>
</tr>
<tr>
<td>4</td>
<td>$12</td>
</tr>
</tbody>
</table>

49. A plant grows from 12 inches tall to 18 inches tall. What is the percent increase in the plant’s height?

50. When you multiply the slopes of two lines, you get \(-1\). What does this tell you about the relationship between the lines?
Final Test

Chapters 1–12

1. Place the following in order from least to greatest.
   \[0.6, \frac{4}{5}, \frac{1}{10}\]

2. What is the equation of the graph shown below?

\[\text{Solve each problem.}\]

3. Jonna needs to travel 496 miles in 8 hours. How fast does she need to go in order to reach her destination on time?

4. A local Internet provider offers a plan in which you pay a flat fee of $5.95 per month plus $0.20 per hour of use. For how many hours of use were you billed if your monthly bill is $8.95?

5. Simplify.
   \[
   \begin{bmatrix}
   4 & 3 \\
   2 & 2
   \end{bmatrix} - \begin{bmatrix}
   2 & 1 \\
   1 & 1
   \end{bmatrix}
   \]

6. \[x(x + 7)\]

7. \[(x^2 + 3x + 4) + (2x + 4)\]

\[\text{Solve.}\]

8. \[2x - 4 = 10\]

9. \[\frac{6x}{x + 4} = (x - 1)\]

10. \[\sqrt{3x} = \sqrt{x + 4}\]

11. \[|x + 3| = 4\]

12. \[x^2 + 6x + 8 = 0\]

Write in standard form the equation of a line that satisfies the given conditions.

13. perpendicular to a line with slope \[= \frac{1}{3}\], through (1, 1)

14. through (0, –3) and (–4, 0)
Final Test (continued)

Chapters 1–12

Evaluate.
15. \(f(4)\) when \(f(x) = 2x + 3\)

16. \(f(4)\) when \(f(x) = 2x^2\)

Factor.
17. \(x^2 + 8x + 12\)

18. \(x^2 + 2x + 3x + 6\)

19. Use the discriminant to find the number of real solutions of \(2x^2 + 9x + 7 = 0\).

20. Find the next two terms in the arithmetic sequence. 4, 8, 12, . . .

Simplify each radical expression.
21. \(\sqrt{8} + \sqrt{2}\)

22. \(\sqrt{8x^2} \cdot \sqrt{2x^2}\)

Simplify each expression.
23. \(16 - 32 \div 2^2\)

24. \(2x^{-1}(2x^3)^2\)

25. \(\frac{6x^2y^3}{2xy^{-1}}\)

26. What is the probability of rolling an odd number on a number cube?

27. A band is planning the order of songs for the opening set of a concert. If there are 12 songs to choose from, how many different arrangements of four songs are possible?

28. Solve and graph the inequality. \(4x - 3 < 17\)

29. \((x^2 + 1)(x + 2)\)

30. \((2x - 3)(x + 2)\)
31. In a laboratory culture, the population of 500 bacteria doubles every hour. The function \( y = 500(2)^x \) models the population growth, where \( x \) is the number of hours. How many bacteria will there be after 3 hours?

32. Write 45,000 in scientific notation.

33. Graph \( y > \frac{1}{3}x - 2 \).

34. Solve each system using any method.
   \[ \begin{align*}
   3x - y &= 13 \\
   2x + 3y &= 16
   \end{align*} \]

35. \[ \begin{align*}
   6x - 2y &= 8 \\
   5x - 2y &= 5
   \end{align*} \]

36. Write a system of equations to model this situation. Then use your system to solve it.
A parking lot has twice as many cars as trucks. The total number of cars and trucks in the parking lot is 24. How many cars and how many trucks are in the lot?

Solve.

37. 3 is 60% of what number?

38. Frank is planning to buy a portable music player. The player costs $30, and the sales tax is 8%. What is the total cost of the music player?

39. Joan must save at least $500 to open a savings account. She saves $80 each month toward her goal. What is the fewest number of months before Joan can open the account?

40. Find the mean, median, and mode of the following golf scores.
   66 68 69 70 71 73 73
Final Test (continued)

Chapters 1–12

Write an equation or inequality. Then solve.

41. The sum of two consecutive even numbers is 30. Find the numbers.

42. An amusement park has an entrance fee of $25 and charges an additional $2 for each ride. Find the maximum and minimum number of rides seen by a small group of visitors whose total fee is at least $37 but no more than $53.

43. Find $x$.

44. Multiply. $\frac{x + 2}{6x + 6} \cdot \frac{x + 1}{x^2 + 5x + 6}$

45. Divide. $(x^2 + 4x + 5) \div (x + 1)$

46. Suppose $y$ varies directly with $x$. Write an equation for the direct variation if $y = 4$ when $x = 2$.

47. Suppose $y$ varies inversely with $x$. Write an equation for the inverse variation if $y = 4$ when $x = 2$.

48. The equation for the area of a circle is given below. Solve the equation for $r$. $A = \pi r^2$

49. Write all the subsets of $\{f, g\}$.

50. Make a table of values and graph the function $y = x^2 - 2$. 
1. Find \( d \) if \( 4(d - 8) = -d + 8 \).
   - A  \(-8\)
   - B  \(-2\)
   - C  \(2\)
   - D  \(8\)

2. Approximate the area of the shaded region shown below using the grid.

3. Factor by grouping.
   \(10x^2 + 19x + 6\)
   - A  \((5x + 2)(2x + 3)\)
   - B  \((x + 2)(10x + 3)\)
   - C  \(2(x + 1)(5x + 3)\)
   - D  \(2(5x + 1)(x + 3)\)

4. The data lists the scores Ryan earned on his last six math tests. His teacher used the data to calculate his mean test score.
   \[ 85 \quad 92 \quad 79 \quad 55 \quad 87 \quad 82 \]

   How will the mean change if the outlier of the data is removed?
   - F  The mean will increase by 5.
   - G  The mean will decrease by 5.
   - H  The mean will increase by 15.
   - J  The mean will not change.

5. Simplify.
   \[ \frac{5.2 \times 10^8}{1.3 \times 10^4} \]
   - A  \(4 \times 10^2\)
   - B  \(4 \times 10^4\)
   - C  \(4 \times 10^{12}\)
   - D  \(4 \times 10^{32}\)

6. Rebecca went jogging. The line segment on the graph shows the distance she ran over time. Which of the following best describes the slope of the line segment?

   - F  Rebecca ran 200 meters per minute.
   - G  Rebecca ran 400 meters per minute.
   - H  Rebecca ran 100 meters per minute.
   - J  Rebecca ran 50 meters per minute.
7. A funnel of water is shown below.

Which graph represents the height of the water in the funnel as it empties out?

8. Which is an algebraic expression for the $n$th number in the following pattern?
   \[2, 4, 6, 8,\ldots\]
   
   F  \[2 + n\]
   G  \[2n + 1\]
   H  \[2(n + 1)\]
   J  \[2n\]

   \[(7x^2 - 8x^3 + 4) + (9x^3 + 2x^2 + 7)\]
   
   A  \[-x^3 + 9x^2 + 11\]
   B  \[16x^5 - 6x + 11\]
   C  \[3x^3 + 9x^2 + 11\]
   D  \[x^3 + 9x^2 - 3\]

10. The graph below shows the weights of several babies at various ages. Which of the following statements is true?

   F  There is no correlation between a baby’s weight and age.
   G  There is a weak negative correlation between a baby’s weight and age.
   H  There is a strong positive correlation between a baby’s weight and age.
   J  There is a strong negative correlation between a baby’s weight and age.
11. A rectangular sandbox is 4 yards long and 3 yards wide. If a child were to walk through the sandbox, directly from one corner to the opposite corner, how far would the child walk?

A 5 yards  
B 6 yards  
C 7 yards  
D 8 yards

12. A wishing well contained 35 pennies. After 6 hours, there were 53 pennies. Which equation can be used to determine the rate, \( r \), of increase in the number of pennies per hour?

F \( 35 = 53 + 6r \)  
G \( 6 = (53 - 35)r \)  
H \( 53 = 35 + 6r \)  
J \( 53 = 35 - 6r \)

13. Find the domain \( d \) of the relation.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

A \( d = \{1, 3, 4\} \)  
B \( d = \{-2, -1, 3, 4\} \)  
C \( d = \{-2, -1, 3, 6\} \)  
D \( d = \{-1, 3, 6\} \)

14. A survey showed that 14 out of 35 families on a street have a cat or dog as a pet. What is the experimental probability that a randomly selected family in the neighborhood will have a cat or dog as a pet?

F 20.5%  
G 40%  
H 49%  
J 50%

15. Natalie earns a weekly salary of $768. Assuming she works 40 hours per week, how much does she earn per minute?

A $0.26  
B $0.32  
C $0.37  
D $0.44

16. The amount of profit, \( p \), made by the cheerleaders after selling poinsettias for a fundraiser is given by the function \( p = 25n - 500 \), where \( n \) is the number of poinsettias sold. What is a correct interpretation of this function?

F The cheerleaders will earn at least $500 in profit during this fundraiser.  
G The cheerleaders will earn $25 in profit for each poinsettia that is sold.  
H The cheerleaders have made a $500 profit, and it will increase in multiples of $25 as they sell poinsettias.  
J The cheerleaders must sell more than 20 poinsettias to make a profit.
17. Dan is designing a tile pattern on grid paper. He drew a 1-by-1 square and shaded it. Then he drew a 3-by-3 square, shading only the corner sections. Then he drew a 5-by-5 square, shading only the corner sections again.

Which expression gives the total number of unshaded sections inside an \( n \)-by-\( n \) square?

A \( n + 1 \)  
B \( n - 1 \)  
C \( n^2 \)  
D \( (n - 1)^2 \)

18. Factor the expression.

\[ x^2 + x - 12 \]

F \((x + 4)(x - 3)\)  
G \((x + 2)(x + 6)\)  
H \((x - 6)(x - 2)\)  
J \((4 + x)(x + 3)\)

19. What is the equation of the line?

A \( y = -\frac{2}{3}x - \frac{2}{3} \)  
B \( y = -\frac{3}{2}x + 1 \)  
C \( y = -2x + 2 \)  
D \( y = \frac{2}{3}x - 1 \)

20. The scatter plot shows the outside air temperature and the number of people at the community swimming pool.

Which is a good prediction of the number of people at the pool when the outside air temperature is 82°F?

F 60 people  
G 80 people  
H 90 people  
J 100 people

21. Suppose \( a \) and \( b \) are positive integers. Which of the following statements is always true?

A \( a - b = b - a \)  
B \( a + b = b + a \)  
C \( \frac{a}{b} = \frac{b}{a} \)  
D \( a + 0 = b + 0 \)

22. Solve \( 6x^2 - 216 = 0 \) for \( x \).

F \(-6 \) and \( 6 \)  
G \(-36 \) and \( 36 \)  
H \(-6 \) and \( 36 \)  
J \(-36 \) and \( 6 \)

23. Simplify the expression.

\[ \frac{-6x^2 + 21x}{-3x} \]

A \( 3x + 7 \)  
B \( 2x - 7 \)  
C \( 3x^2 - 7x \)  
D \( 2x^2 + 7x \)
\[ 13\sqrt{7} + 10\sqrt{7} - 3\sqrt{7} \]
- F \( \sqrt{140} \)
- G \( 26\sqrt{7} \)
- H \( 20\sqrt{21} \)
- J \( 20\sqrt{7} \)

25. Graph \( 5x - 2y = 10 \) using \( x \)- and \( y \)-intercepts.

26. The following chart shows changes in the stock market. Order the fractions from least to greatest.

<table>
<thead>
<tr>
<th>Stocks</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock A</td>
<td>( +\frac{1}{4} )</td>
</tr>
<tr>
<td>Stock B</td>
<td>( +\frac{3}{8} )</td>
</tr>
<tr>
<td>Stock C</td>
<td>( -\frac{1}{8} )</td>
</tr>
<tr>
<td>Stock D</td>
<td>( +\frac{3}{16} )</td>
</tr>
</tbody>
</table>

27. What is the distance between \((-3, 10)\) and \((6, -2)\)?
- A 15
- B 8.5
- C 12.4
- D 10

28. The box-and-whisker plot shows the number of kayak rentals from last year at a family-owned business.

What is the difference between the median number of rentals and the maximum number of rentals?
- F 80 rentals
- G 90 rentals
- H 100 rentals
- J 110 rentals
29. Give the solution to $|3x - 2| \geq 5$.
   A $x \leq -1$ or $x \geq \frac{7}{3}$
   B $x \geq \frac{7}{3}$
   C $-5 \leq x \leq 5$
   D $x \leq 3$ or $x \geq 7$

30. How does the graph of $g(x)$ relate to the graph of $f(x)$?
   $f(x) = 3x - 6$
   $g(x) = 3x - 4$
   F $g(x)$ is steeper than $f(x)$.
   G $g(x)$ is less steep than $f(x)$.
   H $g(x)$ is translated 2 units down from $f(x)$.
   J $g(x)$ is translated 2 units up from $f(x)$.

31. Solve the system by graphing.
   $x + y = -4$
   $y = 4x - 5$
   A
   B
   C
   D
32. A set of mugs includes 5 striped mugs, 6 plaid mugs, and 6 solid color mugs. If one mug is to be selected, what is the probability that it is not a plaid mug?

F $\frac{11}{17}$  
H $\frac{6}{17}$  
G $\frac{5}{6}$  
J $\frac{6}{11}$

33. Multiply.

$(3.8 \times 10^6)(2 \times 10^{-3})$

A $7.6 \times 10^{-18}$  
B $7.6 \times 10^{-3}$  
C $7.6 \times 10^3$  
D $7.6 \times 10^9$

34. The mean of the numbers in the list below is 30.

52, 18, 26, 19, 35

Which two numbers can be added to the list so that the mean of the new list is 30?

F 25, 35  
H 28, 38  
G 22, 34  
J 20, 30

35. A leaky faucet wastes 2 quarts of water per hour. At this rate, how many gallons of water will the faucet waste per day?

A 12 gallons per day  
B 24 gallons per day  
C 48 gallons per day  
D 96 gallons per day

36. A 13-ft ladder is 5 ft from a building. How high up on the building does the ladder reach?

A 8 ft  
B 10 ft  
C 12 ft  
D 13 ft

37. Determine which relation is a function.

A

<table>
<thead>
<tr>
<th>x</th>
<th>-2</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>0</td>
<td>-2</td>
<td>-3</td>
<td>-4</td>
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</table>

B

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
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<tbody>
<tr>
<td>y</td>
<td>0</td>
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<td>3</td>
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C

<table>
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<tr>
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<th>0</th>
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<tbody>
<tr>
<td>y</td>
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<td>5</td>
<td>5</td>
<td>-3</td>
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</table>

D

<table>
<thead>
<tr>
<th>x</th>
<th>6</th>
<th>4</th>
<th>6</th>
<th>-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>-2</td>
</tr>
</tbody>
</table>
38. A certain radioactive substance has a half-life of 10 days. Write an equation to show how much of the radioactive substance a lab has left after \(x\) days if it started with 200 mCi (millicures, a measure of radiation).

- \(f(x) = 0.5^{\frac{x}{10}}\)  
- \(f(x) = 200x^{10x}\)  
- \(f(x) = 200 \cdot (0.5)^{\frac{x}{10}}\)  
- \(f(x) = 0.5 \cdot (200)^{x}\)

39. Simplify the algebraic expression 
\(6x - 8(x^2 - 2x + 3)\).

- \(A\) \(-8x^2 + 22x - 24\)  
- \(B\) \(6x^3 - 20x^2 + 34x - 24\)  
- \(C\) \(-8x^2 - 10x + 24\)  
- \(D\) \(6x^3 - 20x^2 + 2x + 24\)

40. Which is the best estimate for the area of this figure?

- \(F\) 32 square units  
- \(G\) 35 square units  
- \(H\) 38 square units  
- \(J\) 41 square units

41. Simplify the expression.
\[
\frac{15x^3 - 45x^2 + 30x}{5x^3 - 10x^2 + 5x}
\]

- \(A\) \(\frac{5(x - 1)}{x + 2}\)  
- \(B\) \(\frac{5(x + 2)}{x - 1}\)  
- \(C\) \(\frac{3(x - 2)}{x - 1}\)  
- \(D\) \(\frac{3(x - 1)}{x - 2}\)

42. A line passes through points (0, –8) and (4, 8). What is the equation of this line in slope-intercept form?

- \(F\) \(y = x - 8\)  
- \(G\) \(y = 4x - 8\)  
- \(H\) \(y = x + 8\)  
- \(J\) \(y = 8x - 4\)

43. Which table shows values for the function rule \(y = 3x + 5\)?

- \(A\)  
<table>
<thead>
<tr>
<th>(x)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>

- \(B\)  
<table>
<thead>
<tr>
<th>(x)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

- \(C\)  
<table>
<thead>
<tr>
<th>(x)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

- \(D\)  
<table>
<thead>
<tr>
<th>(x)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y)</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>
44. Evaluate the expression for $x = 3$.
\[ \sqrt{x^2 + 6x} \]

\[ x \]

\[ 3 \]

\[ 9 \]

\[ 3\sqrt{3} \]

\[ 9\sqrt{3} \]

45. Which equation is graphed below?

\[ x - 4y = 8 \]

\[ 4x + y = 8 \]

\[ x + 4y = -8 \]

\[ x - 4y = -8 \]

46. Solve $2w^2 = 9w - 9$ for $w$.

\[ w \]

\[ -3, \ -\frac{3}{2} \]

\[ 3, \ \frac{3}{2} \]

\[ \frac{15}{4}, \ \frac{3}{2} \]

\[ -\frac{15}{4}, \ -\frac{3}{2} \]

47. Evaluate $4(b^2 - 4b)$ for $b = 10$.

\[ 60 \]

\[ 200 \]

\[ 240 \]

\[ 400 \]

48. Which expression has the greatest value?

\[ F \ -9 \]

\[ G \ | -12| \]

\[ H \ | -15| \]

\[ J \ |14 - 3| \]

49. The scatter plot shows data from the 1992 U.S. census.

Describe the relationship between the number of years of education and the amount of income.

\[ A \ Income decreases as the number of years of education increases. \]

\[ B \ Income increases as the number of years of education increases. \]

\[ C \ Income is about the same, regardless of the years of education. \]

\[ D \ Income increases as the number of years of education decreases. \]

50. Factor.

\[ 5x^3 - 245x \]

\[ F \ 5x(x - 7)(x + 7) \]

\[ G \ (5x - 7)(5x + 7) \]

\[ H \ 5x^2(x - 7) \]

\[ J \ (5x - 49)(4x + 49) \]
51. Gregory planned to save by putting aside money each week as follows:

<table>
<thead>
<tr>
<th>Weeks, $w$</th>
<th>Dollars, $f(w)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>81</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Which function can be used to determine the amount of money Gregory will put aside on any given week?

A $f(w) = 3^w$
B $f(w) = 3w - 1$
C $f(w) = 3^w - 1$
D $f(w) = w^3$

52. Find the pattern in the table.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Which function best describes the relationship between the variables?

F $4x + 1$
G $3x - 2$
H $2x$
J $x^2 - 7$

53. The population of a city is increasing at a rate of 1.3% each year. Currently the city has a population of 33,000. Assuming that this rate of change continues, which graph could represent the situation described?
54. This scatter plot shows Dr. Zhao’s data on the relationship between average weekly outdoor temperatures and the number of office visits for flu-related illnesses.

About how many flu-related office visits can Dr. Zhao expect in a week when the average temperature is about 20°F?

- F 25
- G 35
- H 45
- J 55

55. Find \(f(-2)\) given \(f(x) = x^2 - 3x + 4\).

- A 4
- B 6
- C 14
- D 16

56. Christine sells jewelry. Each hour she earns $4 plus $3 per customer she sells to. Which equation represents Christine’s hourly wage \(y\) as it relates to the number of customers she sells to \(x\)?

- F \(y = 3x + 4\)
- G \(y = 3x^2 + 4\)
- H \(y = x^3 + 4\)
- J \(y = 3(4)^x\)

57. What is the equation of the line shown?

- A \(y = 2x - 1\)
- B \(y = -x + 1\)
- C \(y = 2x + 2\)
- D \(y = -2x + 1\)

58. How does the graph of \(g(x)\) compare to the graph of \(f(x)\)?

\[f(x) = x^2\]

\[g(x) = x^2 + 5\]

- F The graph of \(g(x)\) is wider than the graph of \(f(x)\).
- G The graph of \(g(x)\) is narrower than the graph of \(f(x)\).
- H The graph of \(g(x)\) is translated 5 units up from the graph of \(f(x)\).
- J The graph of \(g(x)\) is translated 5 units to the right of the graph of \(f(x)\).

59. Find the solution of the following system.

\[3c - 8d = 7\]
\[c + 2d = -7\]

- A \((-3, -2)\)
- B \((-2, -3)\)
- C \((7, -21)\)
- D \((21, -7)\)
60. Simplify.
\[
\sqrt{48} a^4 b^6 \\
\frac{8a^2 b^3}{2a^2} \\
F \ 6ab^6 \\
G \ \frac{\sqrt{3}a}{2b^6} \\
H \ \frac{\sqrt{3}b^6}{2a} \\
J \ \frac{6b^6}{a}
\]

61. The endpoints of \( \overline{AB} \) are \( A (−3, 8) \) and \( B (4, −6) \). What are the coordinates of the midpoint of \( \overline{AB} \)?
A \( (5, 10) \)  
B \( (−7, 14) \)  
C \( (1, 2) \)  
D \( \left( \frac{1}{2}, 1 \right) \)

62. The following scatter plot compares class absences and final exam scores for 15 students.

![Scatter plot](image)

Based on these data, which is the best prediction of the exam score for a student having 9 class absences?
F \( 40 \)  
G \( 45 \)  
H \( 60 \)  
J \( 95 \)

63. Solve the following:
\[
2 - x \leq x + 1 \leq 4.
\]
A \( 2 \leq x \leq 3 \)  
B \( -1 \leq x \leq 3 \)  
C \( 3 \geq x \geq \frac{1}{2} \)  
D \( x \geq -3 \)

64. Simplify the algebraic expression
\[
2x + 3y - 4(2x - y).
\]
F \( 10x + 2y - 4 \)  
G \( -6x + 7y \)  
H \( -6x + 2y \)  
J \( -6x - y \)

65. A bag contains tiles with the letters A, A, F, G, L, L, O, and W. Suppose you draw two tiles from the bag without looking and without replacing a tile once it is selected. What is the probability that you will choose an A and then a G?
A \( \frac{3}{8} \)  
B \( \frac{1}{24} \)  
C \( \frac{11}{28} \)  
D \( \frac{1}{28} \)
## Correlation Chart: End of Course Algebra 1 Practice Test to the Tennessee State Performance Indicators

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Item(s)</th>
<th>Type</th>
<th>My Points</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical Processes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.</td>
<td>8, 43</td>
<td>MC</td>
<td>1-1, 4-7</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.2 Write an equation symbolically to express a contextual problem.</td>
<td>12, 38, 56</td>
<td>MC</td>
<td>2-2, 7-7, 9-7</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.</td>
<td>21, 47, 64</td>
<td>MC</td>
<td>1-4, 1-6, 1-7</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.4 Translate between representations of functions that depict real-world situations.</td>
<td>16, 51</td>
<td>MC</td>
<td>4-5, 7-6</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.</td>
<td>30, 58</td>
<td>MC</td>
<td>5-3, 9-1</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.</td>
<td>6, 42</td>
<td>MC</td>
<td>5-1, 5-3</td>
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</tr>
<tr>
<td>Number and Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.2.1 Operate (add, subtract, multiply, divide, simplify, powers) with radicals and radical expressions including radicands involving rational numbers and algebraic expressions.</td>
<td>24, 44, 60</td>
<td>MC</td>
<td>10-2, 10-3</td>
<td></td>
</tr>
<tr>
<td>SPI 3102.2.2 Multiply, divide, and square numbers expressed in scientific notation.</td>
<td>5, 33</td>
<td>MC</td>
<td>7-3, 7-5</td>
<td></td>
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<tr>
<td>SPI 3102.2.3 Describe and/or order a given set of real numbers including both rational and irrational numbers.</td>
<td>26, 48</td>
<td>MC</td>
<td>1-3</td>
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<th>State Performance Indicators</th>
<th>Test Item(s)</th>
<th>Type</th>
<th>My Points</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
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<tr>
<td><strong>Algebra</strong></td>
<td></td>
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<tr>
<td>SPI 3102.3.1 Express a generalization of a pattern in various representations including algebraic and function notation.</td>
<td>17, 52</td>
<td>MC</td>
<td></td>
<td>4-2, 4-3</td>
</tr>
<tr>
<td>SPI 3102.3.2 Operate with polynomials and simplify results.</td>
<td>9, 39</td>
<td>MC</td>
<td></td>
<td>8-1, 8-2</td>
</tr>
<tr>
<td>SPI 3102.3.3 Factor polynomials.</td>
<td>3, 18, 50</td>
<td>MC</td>
<td></td>
<td>8-5, 8-6, 8-7</td>
</tr>
<tr>
<td>SPI 3102.3.4 Operate with, evaluate, and simplify rational expressions including determining restrictions on the domain of the variables.</td>
<td>23, 41</td>
<td>MC</td>
<td></td>
<td>11-1</td>
</tr>
<tr>
<td>SPI 3102.3.5 Write and/or solve linear equations, inequalities, and compound inequalities including those containing absolute value.</td>
<td>1, 29, 63</td>
<td>MC</td>
<td></td>
<td>2-4, 3-6, 3-7</td>
</tr>
<tr>
<td>SPI 3102.3.6 Interpret various relations in multiple representations.</td>
<td>25, 27</td>
<td>MC</td>
<td></td>
<td>5-3, 5-5</td>
</tr>
<tr>
<td>SPI 3102.3.7 Determine domain and range of a relation, determine whether a relation is a function and/or evaluate a function at a specified rational value.</td>
<td>13, 37, 55</td>
<td>MC</td>
<td></td>
<td>4-6</td>
</tr>
<tr>
<td>SPI 3102.3.8 Determine the equation of a line and/or graph a linear equation.</td>
<td>19, 45</td>
<td>MC</td>
<td></td>
<td>5-3, 5-5</td>
</tr>
<tr>
<td>SPI 3102.3.9 Solve systems of linear equation/inequalities in two variables.</td>
<td>31, 59</td>
<td>MC</td>
<td></td>
<td>6-1, 6-2</td>
</tr>
<tr>
<td>SPI 3102.3.10 Find the solution of a quadratic equation and/or zeros of a quadratic function.</td>
<td>22, 46</td>
<td>MC</td>
<td></td>
<td>9-3, 9-4</td>
</tr>
<tr>
<td>SPI 3102.3.11 Analyze nonlinear graphs including quadratic and exponential functions that model a contextual situation.</td>
<td>7, 53</td>
<td>MC</td>
<td></td>
<td>9-7</td>
</tr>
<tr>
<td><strong>Geometry and Measurement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPI 3102.4.1 Develop and apply strategies to estimate the area of any shape on a plane grid.</td>
<td>2, 40</td>
<td>MC</td>
<td></td>
<td>TN-3</td>
</tr>
<tr>
<td>SPI 3102.4.2 Solve contextual problems using the Pythagorean Theorem.</td>
<td>11, 36</td>
<td>MC</td>
<td></td>
<td>10-1</td>
</tr>
<tr>
<td>SPI 3102.4.3 Solve problems involving the distance between points or midpoint of a segment.</td>
<td>27, 61</td>
<td>MC</td>
<td></td>
<td>Concept Byte, p. 605</td>
</tr>
<tr>
<td>SPI 3102.4.4 Convert rates and measurements.</td>
<td>15, 35</td>
<td>MC</td>
<td></td>
<td>2-6</td>
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</tbody>
</table>

(continued on next page)
### State Performance Indicators

**Data Analysis, Statistics, and Probability**

<table>
<thead>
<tr>
<th>State Performance Indicators</th>
<th>Test Item(s)</th>
<th>Type</th>
<th>My Points</th>
<th>Algebra 1 Student Edition Lesson(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPI 3102.5.1 Interpret displays of data to answer questions about the data set(s) (e.g., identify pattern, trends, and/or outliers in a data set).</td>
<td>28, 62</td>
<td>MC</td>
<td></td>
<td>5-7, 12-4</td>
</tr>
<tr>
<td>SPI 3102.5.2 Identify the effect on mean, median, mode, and range when values in the data set are changed.</td>
<td>4, 34</td>
<td>MC</td>
<td></td>
<td>12-3</td>
</tr>
<tr>
<td>SPI 3102.5.3 Using a scatter-plot, determine if a linear relationship exists and describe the association between variables.</td>
<td>10, 49</td>
<td>MC</td>
<td></td>
<td>5-7</td>
</tr>
<tr>
<td>SPI 3102.5.4 Generate the equation of a line that fits linear data and use it to make a prediction.</td>
<td>20, 54</td>
<td>MC</td>
<td></td>
<td>5-7</td>
</tr>
<tr>
<td>SPI 3102.5.5 Determine theoretical and/or experimental probability of an event and/or its complement including using relative frequency.</td>
<td>14, 32, 65</td>
<td>MC</td>
<td></td>
<td>12-7, 12-8</td>
</tr>
</tbody>
</table>

**Student Comments:**

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Parent Comments:

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Teacher Comments:

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Each year, as a key step in their advancement toward college, more than two million high school students take the SAT Reasoning Test (SAT*)\(^1\) and the American College Test (ACT).\(^2\) Many also take the more modest counterparts of these tests, the Preliminary SAT Reasoning Test (PSAT/NMSQT)\(^1\) and the Preliminary American College Test, now known as PLAN.\(^2\)

Experts disagree as to how well the SAT and the ACT predict college performance. However fair or unfair it may be, most colleges base their decisions on whether or not to accept a student, at least to some degree, on the student’s SAT or ACT score. (PSAT/NMSQT scores are used to qualify students for National Merit Scholarships. Most students take the PSAT/NMSQT and PLAN, however, as practice for the SAT and ACT.) In general, the larger the college, the more importance it places on SAT or ACT test scores in assessing its applicants. Also, the more demanding a college’s academic standards, the higher the test scores it expects of its applicants.

Whichever colleges you apply to, your high school transcript and activities, your college application form and supporting materials, and often letters of recommendation and personal interviews will have the greatest influence on whether you are accepted. Still, it’s to your advantage to achieve the highest score that you can on the SAT or ACT. This section was designed in three parts to help you meet that goal on the math portions of the two tests.

The first part will tell you what you need to know about the two tests so that you won’t be surprised when you sit down on test day and open your booklet. The second part will provide you with a host of test-taking tips. The third part is an SAT/ACT Practice Test you can take to apply what you’ve learned. If you feel you need more work with specific math content, you can turn to your textbook for a more comprehensive discussion of the relevant mathematics or for extra practice.

In the weeks leading up to whichever test you plan to take, you should spend a set amount of time each day preparing for it. Review key math topics, familiarize yourself with the test formats, and practice the test-taking skills described in this book. Of course, there’s no telling how much your preparations will improve your score. Given the importance of the results, however, you have nothing to lose in preparing yourself fully for the test, and a great deal to gain.

\(^1\) SAT is a registered trademark of, and the PSAT is a trademark owned by the College Board, which was not involved in the production of, and does not endorse, this product.

\(^2\) ACT Assessment and the PLAN are registered trademarks owned by ACT, Inc., which was not involved in the production of, and does not endorse, this product.
SAT/ACT: Highlights

The SAT and PSAT/NMSQT

The SAT takes three hours and 45 minutes. There are three sections in the math portion of the test.

<table>
<thead>
<tr>
<th>Section</th>
<th>Length</th>
<th>Type of Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>25 minutes</td>
<td>Multiple-Choice</td>
</tr>
<tr>
<td>II</td>
<td>25 minutes</td>
<td>Multiple-Choice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grid-Ins</td>
</tr>
<tr>
<td>III</td>
<td>20 minutes</td>
<td>Multiple-Choice</td>
</tr>
<tr>
<td>Total</td>
<td>70 minutes</td>
<td></td>
</tr>
</tbody>
</table>

The question types (multiple-choice and grid-ins) will be described later.

In each math section of the test, questions increase gradually in difficulty, with relatively easy questions in the first third of the section and relatively hard ones in the last third.

In addition to the sections listed above, there is a 30-minute “experimental” section, containing new SAT math or verbal questions that are being tried out. This section is not scored.

The PSAT/NMSQT is similar to the SAT, except that it only lasts for about two hours. In the math portion of the PSAT/NMSQT, the SAT’s fifteen-minute, ten-question section is left out. There is no experimental section.

Both tests cover Knowledge of Number and Operations; Algebra, and Functions; Geometry and Measurement; and Statistics, Probability, and Data Analysis. You are not expected to know the fine details of math. Naturally, the more you know, the more likely you are to do well in the test. The SAT and PSAT/NMSQT, however, emphasize math reasoning and problem solving rather than comprehensive proficiency in mathematics.

The quadratic formula is one example of a fine detail. Neither the SAT nor the PSAT/NMSQT requires you to know it. To solve quadratic equations on the tests, you can use factoring or other elementary methods. Of course, if you do know the quadratic formula, you might find it useful, either to solve a problem or to check an answer. In general, however, you’re better off using logic and clear reasoning to solve problems, rather than advanced mathematics.

You’re allowed to bring a calculator to either test—in fact, you’re encouraged to do so. None of the questions will require the use of a calculator. On the average, however, students who use calculators wisely do slightly better than students who do not use them at all, and considerably better than students who use them unwisely. Wise use of the calculator will be discussed later.
**SAT/ACT: Highlights**

**Scoring**

Multiple-choices are scored using the following guidelines: you receive one point for a correct answer and no points if you leave an answer blank. If you answer incorrectly, there’s a penalty:

- one-fourth of a point is subtracted from your score if the question has five answer choices.

With grid-ins, you receive one point for a correct answer and no points for an incorrect or blank answer.

Here’s how one SAT test was scored:

<table>
<thead>
<tr>
<th>50 multiple-choice questions</th>
<th></th>
<th>10 grid-in questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 correct</td>
<td>28 points</td>
<td>6 correct</td>
</tr>
<tr>
<td>12 incorrect (5 answer choices) = (−) 3 points (12 × (\frac{1}{4}) = 3)</td>
<td></td>
<td>3 incorrect</td>
</tr>
<tr>
<td>7 incorrect (4 answer choices) = (−) (\frac{1}{3}) points (7 × (\frac{1}{3}) = (\frac{1}{3}))</td>
<td></td>
<td>1 blank</td>
</tr>
<tr>
<td>3 blank</td>
<td>0 points</td>
<td></td>
</tr>
<tr>
<td><strong>Raw Score</strong></td>
<td>= (\frac{28}{3}) points</td>
<td></td>
</tr>
</tbody>
</table>

The policy of subtracting a fraction of a point for incorrect answers on multiple-choice questions is called a “guessing penalty.” However, as you’ll learn in the part on test-taking tips, there’s a way you can turn this so-called penalty to your advantage.

The raw score is now rounded to the nearest point and converted to a “scaled” score between 200 and 800 (SAT), or 20 and 80 (PSAT/NMSQT). There are no passing or failing scores.

About a month after you take either test, you’ll receive your results. These consist of your scaled score and a “percentile” score. The percentile score allows you to compare your results with those of all the other students who took the test. A score in the 64th percentile means that you did better than 64 percent of the people who took the test. The average SAT math score nationwide is 500 points.
SAT/ACT: Highlights

Question Types
There are two types of questions on the math section of the SAT.

Multiple-Choice Questions
Five answers are given for each multiple-choice question. Decide on the correct choice and fill in the corresponding oval on the answer sheet.

If 2 cans of tomatoes weigh 28 ounces, what is the weight, in ounces, of 7 cans of tomatoes?

(A) 2  (B) 8  (C) 56  (D) 98  (E) 196

Grid-In Questions
Grid-in questions are called “student-produced responses” on the test. Each requires you to calculate the correct answer to a question and then write it on the answer grid. Gridding an answer incorrectly will result in a zero score even if your answer is correct. For that reason, you should review the method for gridding answers before you take the test, because there are several ways to grid incorrectly. The following pages will give you a chance to do that.

Sample Grids
Your responses are recorded on a special answer grid that provides ways of showing decimal points and fraction bars. You will be able to code decimal and fraction answers. For example, a student who gets an answer of 23.9 on a problem would code the answer as shown in this grid.

The grid is composed of four columns. If you look closely, you will notice that along with the digits 0 through 9, the division sign ( / ) and the decimal point ( . ) are available. The first column cannot be filled with 0 or /. Also, each character in the answer must occupy a single column in the grid. So the answer 23.9 requires all four available columns. Notice that there is no provision in the grid structure for coding negative values. This is a clear message that there will be no questions in this part of the test that have negative answers.

The following guidelines and grids illustrate how to code decimals, fractions, and mixed-number answers on the student-produced response section of the test.

Each answer is shown with more than one coded grid. The grids show that the format is quite flexible. The examples should also make you realize that you may need to rewrite an answer in an equivalent form in order to code it correctly on the grid.
**Grid-Coding Guidelines**

1. **Complete Answers** If a decimal answer cannot be fully coded, the coded answer must be as complete as possible.

   ![Complete Answers Example](image)

   Code: 0.65341

2. **Coding** There is a maximum of four columns on each grid. Each digit, decimal point, or division sign must occupy its own column. Coding may begin in any column as long as the answer is complete as described above. Do not leave a blank column between two marked columns. The scoring machine does not read the numbers above the columns, but writing the answer there may help you code correctly.

   ![Coding Example](image)

   Code: \( \frac{5}{9} \)
3. **Improper Fractions**  
Improper fractions such as \( \frac{23}{6} \) and \( \frac{81}{9} \) may be coded directly. Other improper fractions, such as \( \frac{150}{60} \), must be reduced or rewritten as an equivalent decimal in order to fit into the four available columns.

<table>
<thead>
<tr>
<th>Code: ( \frac{7}{5} )</th>
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<tbody>
<tr>
<td>( \frac{7}{5} )</td>
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<tr>
<td>( \frac{1}{5} \cdot 3 )</td>
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</tbody>
</table>

4. **Mixed Numbers**  
Mixed numbers must be rewritten as improper fractions or decimals. For \( \frac{2}{3} \), completing the grid with \( \frac{2}{3} / 1 / 3 \) is not a correct option since it would be read as \( \frac{2}{3} \).

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<th>Code: ( \frac{2}{3} )</th>
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<tbody>
<tr>
<td>( \frac{2}{3} )</td>
</tr>
<tr>
<td>( 2 \cdot 6 \cdot 8 )</td>
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5. **Multiple Correct Answers**  
Some questions may have many correct answers. If any number \( x \) such that \( 0.2 < x < 0.25 \) satisfies the problem, then any answer from the set of \{0.201, 0.202, ..., 0.248, 0.249\} would be scored as correct. Correct answers would also include fractional equivalents like \( \frac{9}{40} \).

<table>
<thead>
<tr>
<th>Code: ( 0 &lt; x &lt; \frac{1}{4} )</th>
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<tbody>
<tr>
<td>( 0.21 )</td>
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<tr>
<td>( 0.24 )</td>
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<tr>
<td>( 0.4 )</td>
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</table>
6. **Rounding Answers**  
A decimal answer does not need to be rounded unless explicit directions are given in the question.

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7. **Simplifying Fractions**  
Simplifying is not required unless a fraction does not fit into the columns of the grid.

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Code: 156

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Your high-school counselor can give you information from the College Board to help you prepare for the **SAT Reasoning Test**. You can also learn more about the SAT online. The place to start is

[http://www.collegeboard.com](http://www.collegeboard.com)

where you will find testing dates, registration procedures, practice test questions, and test-taking tips.
SAT/ACT: Highlights

The ACT and PLAN

The ACT takes three and one-half hours. The math section of the test lasts one hour and consists of 60 multiple-choice questions. Questions are arranged roughly in order of difficulty, from easiest to hardest. As with the SAT, you may use a calculator on the ACT.

Scoring

Unlike the SAT, the ACT is not scored by deducting a fraction of your incorrect answers from your correct ones. You get one point for a correct answer and no points for either an incorrect answer or an answer left blank. There is no penalty for guessing.

Here’s how one ACT test was scored:

60 multiple-choice questions
38 correct = 38 points
22 incorrect = 0 points

Raw Score = 38 points

The content of ACT test questions is invariable. There are always

- 24 questions on pre-algebra and elementary algebra;
- 18 questions on intermediate algebra and coordinate geometry;
- 14 questions on geometry;
- 4 questions on basic trigonometry.

The PLAN is a mini-ACT. The math section of the test lasts 40 minutes and consists of 40 multiple-choice questions, apportioned as follows:

- 14 questions on pre-algebra;
- 8 questions on elementary algebra;
- 7 questions on coordinate geometry;
- 11 questions on plane geometry.

As on the ACT, you can use a calculator when you take the PLAN.

Getting Your Results

You’ll receive your ACT results in four to six weeks. Your math score (and your score in each of the other three areas of the test) will be a number from 1 to 36; 36 will be the highest possible score. (The PLAN is scored from 1 to 32.) As with the SAT, you’ll also receive a percentile ranking so that you can compare your results with those of other students who took the test.
SAT/ACT: Highlights

When to Take the ACT

The ACT is given several times each year. If possible, arrange to take the test on a day when “Test Information Release” is in effect. Following the test, for a small fee, you can receive a copy of the test that you took and a photocopy of your answer sheet.

Having survived the test somehow, you may find the suggestion that you revisit it through a copy of your very own answer sheet rather humorous. Nevertheless, there are distinct advantages to doing so. You can check to make sure the scoring machine didn’t make any errors. More important, you can check your work to discover areas where you were strong and other areas where you need to “bone up” on the subject matter covered by the test. Such knowledge will be useful to you generally, and even more so if you decide to take the test again.

If you do take the ACT several times, you’ll be allowed to decide which of your scores should be reported to colleges.

Your high-school counselor can also give you information from the American College Testing Program to help you prepare for the ACT Assessment. You can also learn more about the ACT online. The place to start is

http://www.act.org

where you will find testing dates, registration procedures, practice test questions, and test-taking tips.
SAT/ACT: Test-Taking Tips

Preparing for the Test
Long-term planning for both the SAT and the ACT should include the following:

**Work hard in math class.**
No amount of last-minute cramming can substitute for serious study in your current math class. Students who do well in their math classes generally do well on the math portion of the SAT and the ACT.

**Look for ways to apply math in your daily life.**
Problems requiring students to interpret everyday data, calculate real-world probabilities, and otherwise apply mathematics to realistic problem situations are becoming more and more common on the SAT and ACT. At the same time, old-style “story problems” involving age and distance are becoming rare.

The best way to learn to solve real-world problems is to begin to see math as a component of your everyday life, rather than as an irrelevant subject whose principles you must tediously memorize. Math comes alive and begins to make sense when you see it in newspapers and on billboards, when you hear it discussed at meetings and find it in the activities you do each day. Cultivate the practice of discovering math in your everyday life.

Short-term planning for both the SAT and the ACT should include the following:

**Begin a disciplined math-review program.**
Gather review materials such as SAT and ACT review books you can find in the public or school library, and official publications of the SAT and ACT boards. Set aside a specific amount of time each day for review. Make notes about questions that arise as you review, so you can ask your math teacher about them the next day.

Begin your review program four to eight weeks before you plan to take the test and continue right up to the day before the test. Then give yourself a break. Last-minute cramming the night before the test will probably not improve your test score, but it will almost certainly frazzle you. Congratulate yourself for your hard work, enjoy an evening away from your review program with your family or friends, and then get a good night’s sleep.

**Practice, practice, practice.**
As you review, don’t be satisfied with simply reading review materials and memorizing methods or procedures for solving problems. Prepare for the test by repeatedly practicing everything you’ll experience on test day.

- Practice solving SAT- or ACT-type problems again and again and again.
- If you’re taking the SAT, practice solving problems written in each question format—multiple-choice and student-produced response. Spend extra time practicing the gridding of student-produced responses, which present so many ways to go wrong.
SAT/ACT: Test-Taking Tips

- Practice reading directions.
- Practice filling in answer sheets.
- Practice working under test conditions by setting an alarm clock and giving yourself set amounts of time to answer specific numbers of questions. For example, to model the multiple choice portion of the math SAT test you could give yourself 25 minutes to answer 20 multiple-choice items. To model the math portion of the ACT test, you could give yourself 30 minutes to answer 30 multiple-choice items.
- Practice relaxing and not becoming rattled when you can’t answer a question or several questions in a row.
- Practice using your calculator to solve problems.
- Practice making decisions as to whether or not you will use your calculator to solve a problem.
- Practice making decisions as to whether or not you will guess answers to questions that stump you.

The more you practice at home what you’ll actually be doing at the test site, the more the test itself will seem familiar and nonthreatening, allowing you to obtain your best possible score.

Be ready to go on the morning of the test.

Collect the following materials before test day, and put them in a place where you’ll know where to find them:

- #2 pencils
- Your ID. This must include your photo or a brief description of you. A description must be written on school stationery or on a school ID form. You must sign it in front of your principal or guidance counselor, who must also sign it.
- Your admission ticket
- Your calculator, with fresh batteries
- A watch
- A healthy snack

Be sure you’ve scoped out ahead of time exactly how to get to the test site and how long it will take you to get there. If you rush in at the last second, you won’t be relaxed and focused on taking the test. And if you rush in after the last second, you won’t be allowed to take the test.
SAT/ACT: Test-Taking Tips

Taking the Test
The following are time-honored test-taking strategies.

Manage Your Time Efficiently.

The questions in each section of the test are arranged roughly in order of difficulty. As you begin, make a quick estimate of the average amount of time you have to answer each question. Use the estimate to guide you through the section. Allow yourself a little less than the average amount of time for the early, easier first questions so that you’ll have extra time for the harder ones later on.

Starting with the first question, move as quickly as you can through the section. Consider each question in turn. Make a quick assessment as to whether you can solve it rapidly. If you think you can, do so. Work at a comfortable pace, but don’t linger. Spending too much time on a problem in the fanciful belief that you’ve almost got it is a killer. Remember: all problems are worth the same number of points. You receive one point for each easy question that you answer correctly and one point for each hard one. How should you spend your time?

If you decide that you can probably solve a problem with a little more time, draw a circle around it. After you’ve made your first pass through all the questions, answering those that seem easy, return to the questions you’ve circled. This second look is often successful, so don’t get discouraged if you find yourself circling lots of questions. Continue to pace yourself during the second pass. Work your way through the questions you think you have a chance on, but don’t be reluctant to abandon them again and move on if they continue to tie you up. After the second pass, return to the questions that continue to stump you if time remains.

If you’re sure that you won’t be able to solve a problem, draw an X beside it and forget it. Throwing in the towel on questions you can’t answer is simply good time management and nothing to apologize for. No one is expected to answer every question correctly and few people do.

Be careful.

Beware of the following:

- Under the pressure of test-taking, it’s easy to make careless mistakes. Work through calculations methodically, rechecking them quickly at the end. Ask yourself if answers are reasonable. Is the price after a discount greater than the original price? Does one of the acute angles in a right triangle measure 150°? Use estimation whenever possible. On multiple-choice questions, an estimate may be enough to help you decide which of the given answers is correct without actually working it out.

- On multiple-choice questions, watch out for “obvious” choices. In the first part of a section, where the questions are relatively easy, an answer that seems obvious may be the right one. But in the last part, the obvious answer may have been put there to deceive you. After all, if an answer is obvious, what’s the question doing in the hard part of the test?
SAT/ACT: Test-Taking Tips

- Check and double-check to make sure that you’re writing your answers in the correct spots, and beside the correct numbers. To guard against potential disasters, many students write all their answers in their test booklets only, transferring them all at once to their answer sheets in the final minute or two.

- Beware of long computations. SAT and ACT problems can usually be solved with minimal calculations. If you find yourself in the midst of a multi-step nightmare, it’s best to stop and look for a shortcut—or move on to the next question.

- If you’re told that a figure is not drawn to scale, believe it. Don’t assume that lengths and angles are drawn accurately.

- Measurements may be given in different units. If they are, convert and work the problem in one unit.

Be smart.

Use these ideas to simplify your work and improve your score.

- Write in your test booklet. There’s no reward for a clean booklet and no penalty for one that’s covered with pencil marks. If a question doesn’t have a drawing and one would help, draw it. Write measurements and values on the drawing. When you calculate an answer, write out your calculations so that you can check them later. The next time, try doing them a different way. This is a good way to check your work and often reveals careless mistakes.

- On multiple-choice questions, draw a line through choices you know to be wrong. This will simplify the job of choosing the right answer.

- Look at the answer choices before working a problem. This will show you the form of the answer that is required (a fraction, for example), allowing you to work the problem in that form from the beginning rather than having to rewrite your answer later in a different form.

- Under “Reference Information,” the SAT booklet provides a considerable amount of information on geometrical relationships. Use it.

- Know commonly used numbers. Recognize powers of 2, 3, and 5. Know the decimal equivalents for simple fractions with denominators of 2, 3, 4, 5, 6, 8, and 10. Know the common Pythagorean triples 3-4-5 and 5-12-13 and recognize their multiples.

Use your calculator wisely.

Every test question can be answered without a calculator, so you don’t have to bring one. Bring one anyway. Make it one you’re familiar with and comfortable using. It can be a scientific or graphing calculator, but many students find that a simple four-function model with a square-root key works best. That’s because the kinds of calculations you’ll be using it for (see next page) are easier to perform on a simple calculator than they are on a complex one. (You won’t be asked to find log 453.779 or arcsin 0.8812 on the SAT or ACT). Equally important, the keys on a simple calculator
SAT/ACT: Test-Taking Tips

are easier to hit than the keys on a scientific or graphing calculator, so you are less likely
to make a careless mistake.

Resist the temptation to use your calculator, or to try to use it, to solve every problem. Most of the problems on the SAT and the ACT can be solved far more easily without a calculator than with it. Both tests are designed to test your knowledge of mathematics and your ability to solve problems, not to find out whether you know how to punch the keys on a calculator. So, in most cases, you’ll save time and improve your chances of scoring points by turning to your calculator only for the specific purposes listed below, or to check your work, or when you can see no other approach.

Example

Find the product: \( \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7} \times \frac{7}{8} \times \frac{8}{9} \)

(A) 0.1  (B) \( \frac{1}{9} \)  (C) 0.11111111  (D) \( \frac{1}{90} \)  (E) Not given

To solve the problem, you could use your calculator:

\[
\frac{1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8}{2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9} = \frac{40,320}{362,880} = 0.11111111 \text{ (to 8 places).}
\]

Although (C) looks right, it and your solution are rounded versions of the correct answer. To find the correct answer, you must now use your calculator again to rewrite the fraction choices \( \frac{1}{9} \) and \( \frac{1}{90} \) as decimals. Doing so will confirm that the correct answer is (B) \( \frac{1}{9} \).

The wise test-taker will look for a more efficient solution before plunging into a messy calculation like the above. Here, the product \( \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7} \times \frac{7}{8} \times \frac{8}{9} \)

can be quickly simplified by noticing that every denominator except the last equals the numerator of the following fraction. Therefore, all of the figures can be divided out except the first numerator and the last denominator.

\[
\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7} \times \frac{7}{8} \times \frac{8}{9} = \frac{1}{9}
\]

A calculator is useful for doing the following, any of which you might be faced with on the test:

- finding percents;
- finding square roots;
- rewriting fractions as decimals.

A few more calculator tips:

- If you find yourself performing complex calculations, you’re probably doing something wrong. Stop and rethink your approach to the problem.
SAT/ACT: Test-Taking Tips

- When you’re solving sample problems as part of your preparation for the test, practice making quick decisions as to whether or not you should use your calculator.

- Practice entering numbers on your calculator correctly. When you take the test, enter numbers deliberately and with care. Herein lies another drawback of calculators: They provide no paper trail to tell you that you pressed the wrong buttons.

- Don’t forget to CLEAR after you finish performing a calculation.

**Stick to a sensible guessing strategy.**

**Guessing on the ACT**

Your score on the ACT is based on the number of questions you answer correctly. No points are deducted for incorrect answers. Therefore, you should answer every question, even those that stump you. As you take the test, mark the questions you can’t answer. Return to them after you’ve answered as many questions as you can and give those that puzzle you a second try. In the final seconds before you are told to stop, fill in the blank spaces on your answer sheet with random guesses.

To see why this strategy makes sense, consider Bill and Phil, both of whom are completely boggled by 20 questions on the math portion of the ACT.

- Bill left all 20 questions unanswered.

  Score:  
  
  \[
  \begin{array}{c|c|c}
  \text{Correct} & \text{Incorrect} & \text{Total} \\
  \hline
  0 & 0 & 0
  \end{array}
  \]

  0 correct = 0 points

  0 incorrect = 0 points

  Total = 0 points

- Phil guessed the answers to all 20. The probability of guessing the correct answer from among 5 choices is one-fifth, and, indeed, Phil guessed \(20 \cdot \frac{1}{5} = 4\) correctly.

  Score:  
  
  \[
  \begin{array}{c|c|c}
  \text{Correct} & \text{Incorrect} & \text{Total} \\
  \hline
  4 & 16 & 4
  \end{array}
  \]

  4 correct = 4 points

  16 incorrect = 0 points

  Total = 4 points

Phil outscored Bill by 4 points. On the ACT, guessing answers to questions that totally stump you is likely to improve your score.

**Guessing on the SAT**

There is widespread confusion about whether or not to guess answers to multiple-choice questions on the SAT. Much of the confusion is caused by the mistaken understanding that guessers are somehow penalized beyond the bounds of probability by a mysterious “guessing penalty.”

In fact, there is no extra penalty for guessing on the SAT. Again, consider Bill and Phil, now taking the SAT. Once more, they’re unable to answer 20 questions, each with 5 answer choices.
SAT/ACT: Test-Taking Tips

- Bill left all 20 questions unanswered.
  
  \[
  \begin{array}{c c c}
  \text{Score:} & 0 \text{ correct} & = 0 \text{ points} \\
  & 0 \text{ incorrect} & = 0 \text{ points} \\
  \hline
  \text{Total} & = 0 \text{ points}
  \end{array}
  \]

- Phil guessed the answers to all 20 questions. As before, he guessed correctly on exactly the number of questions that chance predicts, \(20 \times \frac{1}{5} = 4\).
  
  \[
  \begin{array}{c c c}
  \text{Score:} & 4 \text{ correct} & = 4 \text{ points} \\
  & 16 \text{ incorrect} & = (-)4 \text{ points} \\
  \hline
  \text{Total} & = 0 \text{ points}
  \end{array}
  \]

Bill and Phil both earned 0 points for their efforts. The conclusion is this: If you are completely stumped by an SAT multiple-choice question—that is, if all 5 answers appear equally likely to be correct—it makes no difference in the long run whether you guess the answer or leave the space blank on your answer sheet.

The arguments against guessing in such situations are mostly subjective. The knowledge that you’re guessing answers blindly may begin to weigh on your mind, affecting your ability to do your best on the test. And, of course, you waste a tiny amount of time filling in your answer sheet with random guesses. You’re likely to do just as well leaving the spaces blank.

Improving the Odds

As you’ve seen, the odds are that guessing blindly on multiple-choice questions that are complete stumpers won’t hurt you on either the ACT or the SAT; on the ACT, it will probably help you.

But you’re not going to impress any college admissions officers with a score obtained through blind guessing. That brings us to a sensible guessing strategy over which you have some control, and one that is likely to improve your score: **Eliminate first and then guess**.

If you can eliminate just one of the given answers to a question as definitely wrong, it’s to your advantage to guess from among the remaining choices. If you can eliminate two answers, it’s *strongly* to your advantage to guess. If you can eliminate three answers, *you’re very foolish not to guess*. (If you can eliminate four answers, the one you didn’t eliminate is the answer!)

The reason that this kind of educated guessing makes sense is that, following elimination, the potential gain from a correct answer chosen through blind luck exceeds the potential deduction for an incorrect answer. The more answers you can eliminate, the greater the gap between potential gain and potential loss.

Therefore, on multiple-choice questions for which you cannot choose the correct answer, you should follow this strategy: Eliminate as many answers as possible, and then guess. This strategy makes sense on both the SAT and the ACT. (And on the ACT, don’t forget to randomly fill in all blank spaces before you’re told to put down your pencil. On the SAT there’s no need to do that, though the odds are that you’ll suffer no penalty if you do.)
SAT/ACT: Practice Test

Section I Multiple Choice

In the following problems you have five choices for an answer. Only one choice is correct. Mark your answer by filling in the correct bubble on the answer sheet that your teacher provides.

1. \( \frac{42}{25} \times \frac{25}{42} = \)
   - (A) \( \frac{1}{2} \)
   - (B) \( \frac{3}{4} \)
   - (C) 1
   - (D) 2
   - (E) \( \frac{5}{2} \)

2. The price of an $8.00 calculator is lowered 20%. What is the new price?
   - (A) $1.60
   - (B) $3.20
   - (C) $4.80
   - (D) $6.40
   - (E) $8.00

3. If 6 is added to 2 times a number, the result is 3 less than the number.
   - (A) 6 + 2 \( n \) = 3 \( n \)
   - (B) 2\( n \) + 6 < 3\( n \)
   - (C) 6 = 2\( n \) – 3 + \( n \)
   - (D) 2\( n \) + 6 = \( n \) – 3
   - (E) 2\( n \) + 6 + 3 < \( n \)

4. How many members are there in the set of even numbers from 60 to 120 inclusive?
   - (A) 15
   - (B) 29
   - (C) 30
   - (D) 31
   - (E) 45
### SAT/ACT: Practice Test

#### Section I Multiple Choice (continued)

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>5.</strong></td>
<td><em>a</em> is a factor of 44. <em>b</em> is a factor of 27. Which number below could not be a value for <em>ab</em>?</td>
<td><strong>7.</strong> The sales tax on an $18 meal is $0.90. At that rate, what would be the sales tax on a $30 meal?</td>
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<tr>
<td></td>
<td>(A) 6</td>
<td>(A) $1.80</td>
</tr>
<tr>
<td></td>
<td>(B) 18</td>
<td>(B) $1.50</td>
</tr>
<tr>
<td></td>
<td>(C) 20</td>
<td>(C) $1.44</td>
</tr>
<tr>
<td></td>
<td>(D) 36</td>
<td>(D) $0.60</td>
</tr>
<tr>
<td></td>
<td>(E) 99</td>
<td>(E) $0.54</td>
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<tbody>
<tr>
<td><strong>6.</strong></td>
<td>Bookshelves sell for $4.49. If you buy in quantity, the cost is reduced to $3.99 per shelf. How much do you save if you buy 50 shelves at the lower price?</td>
<td><strong>8.</strong> Simplify: ( \frac{2}{6} \cdot \frac{4}{8} \cdot \frac{6}{10} \cdot \frac{8}{12} ).</td>
</tr>
<tr>
<td></td>
<td>(A) $209.50</td>
<td>(A) ( \frac{1}{15} )</td>
</tr>
<tr>
<td></td>
<td>(B) $199.50</td>
<td>(B) ( \frac{1}{8} )</td>
</tr>
<tr>
<td></td>
<td>(C) $29.50</td>
<td>(C) ( \frac{3}{11} )</td>
</tr>
<tr>
<td></td>
<td>(D) $25.00</td>
<td>(D) ( \frac{1}{2} )</td>
</tr>
<tr>
<td></td>
<td>(E) $15.00</td>
<td>(E) ( \frac{5}{9} )</td>
</tr>
</tbody>
</table>
9. If \( \frac{x + 5}{x - 5} = 2 \), then \( x - 5 = \)
   
   (A) \(-5\)  
   (B) \(0\)  
   (C) \(5\)  
   (D) \(10\)  
   (E) \(15\)

10. If \( |x + 1| = 5 \), then \( x = \)

   (A) \(4\) only  
   (B) \(4\) or \(-4\)  
   (C) \(-4\) only  
   (D) \(-6\) only  
   (E) \(-6\) or \(4\)

11. If \( m = 3 \) and \( n = -2 \), what is the value of \(-2(m - n) + n^3?\)

   (A) \(-4\)  
   (B) \(-10\)  
   (C) \(-12\)  
   (D) \(-16\)  
   (E) \(-18\)

12. In the Drama Club, there are 9 students aged 15, 7 students aged 16, 11 students aged 17, and 4 students aged 18. Which of the following statements about the ages of the students is true:

   I. The mode is 17.  
   II. The median is 16.  
   III. The mean is 15.

   (A) I and II  
   (B) I and III  
   (C) II and III  
   (D) I, II, and III  
   (E) None
13. The area of a circle is $100\pi$. The diameter is
(A) 10
(B) $10\pi$
(C) 31.4
(D) 20
(E) $20\pi$

15. The slope of line $\ell$ is 2. $x =$
(A) $-16$
(B) $-4$
(C) 2
(D) 4
(E) 16

14. Simplify $\frac{20 + x}{20}$.
(A) $x$
(B) $1 + x$
(C) $1 + \frac{x}{20}$
(D) $20 + x$
(E) $20 + \frac{x}{20}$

16. What is $x$ in the above figure?
(A) $20^\circ$
(B) $25^\circ$
(C) $30^\circ$
(D) $40^\circ$
(E) $60^\circ$
SAT/ACT: Practice Test

Section I Multiple Choice (continued)

17. What is the area of the above triangle?
   (A) $10\sqrt{3}$
   (B) $20\sqrt{3}$
   (C) $50\sqrt{3}$
   (D) $100\sqrt{3}$
   (E) $200\sqrt{3}$

18. In the figure above, $AB = AC$. What is the sum of $a + n$?
   (A) 180
   (B) 190
   (C) 200
   (D) 210
   (E) Cannot be determined

19. Four small congruent equilateral triangles are placed together to form a larger equilateral triangle. Write the ratio
   perimeter of small triangle
   perimeter of large triangle.
   (A) $\frac{1}{6}$
   (B) $\frac{1}{4}$
   (C) $\frac{1}{3}$
   (D) $\frac{1}{2}$
   (E) $\frac{2}{3}$

20. Lines $m$ and $n$ are parallel. $x =$
   (A) 9
   (B) 36
   (C) 54
   (D) 60
   (E) 64
### SAT/ACT: Practice Test

Section I Multiple Choice (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>21.</strong> What is the (y)-intercept of the line (ax + by = c)?</td>
<td>(A) (\frac{a}{b}) &lt;br&gt; (B) (-\frac{a}{b}) &lt;br&gt; (C) (c) &lt;br&gt; (D) (\frac{c}{b}) &lt;br&gt; (E) (-abc)</td>
</tr>
<tr>
<td><strong>23.</strong> In (\triangle ABC), (C) is a right angle, (BC = 12), and (AC = 16). (\sin B = \frac{4}{5}).</td>
<td>(A) (\frac{4}{5}) &lt;br&gt; (B) (\frac{3}{5}) &lt;br&gt; (C) (\frac{4}{3}) &lt;br&gt; (D) (\frac{5}{4}) &lt;br&gt; (E) (\frac{5}{3})</td>
</tr>
<tr>
<td><strong>22.</strong> Find the distance from ((-4, 4)) to the intersection of the lines. (x + y = 7) (x - y = 9)</td>
<td>(A) 4 &lt;br&gt; (B) 5 &lt;br&gt; (C) 10 &lt;br&gt; (D) 12 &lt;br&gt; (E) 13</td>
</tr>
<tr>
<td><strong>24.</strong> All of the circle sectors have equal areas, but the labels have been omitted from 5 sectors. If a dart strikes each board randomly, the probability of hitting (D) or (E) is (\frac{1}{4}). How many of the 5 blank sectors should be labeled (E)?</td>
<td>(A) 1 &lt;br&gt; (B) 2 &lt;br&gt; (C) 3 &lt;br&gt; (D) 4 &lt;br&gt; (E) 5</td>
</tr>
</tbody>
</table>
SAT/ACT: Practice Test
Section I Multiple Choice (continued)

25. Which of the following is the midpoint of (4, 8) and (−2, 1)?
   (A) \(\left(3, \frac{7}{2}\right)\)
   (B) \(\left(1, \frac{9}{2}\right)\)
   (C) \(\left(3, \frac{9}{2}\right)\)
   (D) \(\left(6, \frac{1}{2}\right)\)
   (E) none of the above

26. Which of the following expressions is not equivalent to \(2\sqrt{3} + 3\sqrt{2}\)?
   (A) \(7\sqrt{3} + 19\sqrt{2} - 5\sqrt{3} - 16\sqrt{2}\)
   (B) \(\sqrt{3} \cdot 4 + \sqrt{2} \cdot 9\)
   (C) \(\sqrt{12} + \sqrt{18}\)
   (D) \(\sqrt{\frac{36}{3}} + \sqrt{\frac{36}{2}}\)
   (E) \(5\sqrt{\frac{3}{2}}\)

27. In an inverse variation, the constant of variation is 6. When \(y = \frac{1}{2}\), which of the following is \(x\)?
   (A) \(\frac{1}{3}\)
   (B) \(\frac{13}{2}\)
   (C) 3
   (D) 12
   (E) none of the above

28. Which of the following lists all of the values excluded from the domain of \(y = \frac{3}{x^3 - 4x}\)?
   (A) \(x = 2\) and \(x = -2\)
   (B) \(x = 0\) and \(x = 2\)
   (C) \(x = \frac{1}{4}\)
   (D) \(x = 2, x = 0, \) and \(x = -2\)
   (E) \(x = 0\) and \(x = 4\)
29. Which of the following is the lowest common denominator of \( \frac{1}{2y^2 - 11y - 21} \) and \( \frac{3}{y - 7} \)?

(A) \((y - 7)(2y + 3)\)

(B) \((y - 7)(2y^2 - 11y - 21)\)

(C) \((y - 7)\)

(D) \(2y^3 - 25y^2 + 56y + 147\)

(E) none of the above

30. Which of the following is the solution of \( \frac{3}{a} - \frac{16}{a^2} = 2? \)

(A) \(a > 0\)

(B) \(a = \frac{14}{3}\)

(C) \(a = 16\)

(D) \(2a^2 - 3a + 16 = 0\)

(E) none of the above

31. Which of the following equations models exponential decay?

(A) \(y = \frac{1}{4} \cdot 500^x\)

(B) \(\frac{1}{3}y = 6 \cdot 100^x\)

(C) \(y = 0.5 \cdot 8^x\)

(D) \(y = 23 \cdot \left(\frac{1}{2}\right)^x\)

(E) \(y = 0.004 \cdot 2^x\)

32. Which of the following is true?

(A) \(\frac{x^{-3}}{x^{-4}} = \frac{x}{x^4}\)

(B) \(\frac{y^2}{y^0}\) is undefined

(C) \(\frac{h^5c^{-2}d^4}{b^5cd^{-2}} = \frac{d^8}{bc^3}\)

(D) \(\frac{f^2g^{-3}h^3}{f^4g^2h^{-4}} = \frac{h^7}{f^2g^5}\)

(E) none of the above
### SAT/ACT: Practice Test

**Section II Student-Produced Responses**

After you solve each problem on this section, enter your answer on the corresponding grid provided on your answer sheet.

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1. In $\triangle ABC$, $\angle A$ is 6 times the measure of $\angle C$, and $\angle C$ is twice the measure of $\angle B$. What is the measure of $\angle B$?</td>
<td>3. Mrs. M drove 10 minutes at 60 miles per hour, then 20 minutes at 30 miles per hour. For the rest of the hour, she drove at a rate that put her 48 miles from her starting point. What was that rate?</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>2. A square with sides equal to 6 has the same area as a triangle with a base of 9. What is the height of the triangle?</td>
<td>4. $1,024$ divided by $32^2$ equals what power of 2?</td>
</tr>
</tbody>
</table>
5. The hypotenuse of a $30^\circ$-$60^\circ$-$90^\circ$ triangle is $10\sqrt{2}$. To the nearest whole number, what is the length of the triangle’s shorter leg?

7. Five cards are labeled 0, 2, 4, 6, and 8. Two cards are picked without replacement. What is the probability that their product is 0?

6. In one town last year there was a ratio of 1 recreational vehicle to every 2 trucks. This year there are the same number of trucks but 200 more recreational vehicles, and the ratio is now 1 to 1. How many trucks are there this year?

8. MARCHING BAND CONTEST RESULTS

<table>
<thead>
<tr>
<th>Musical Quality</th>
<th>1st Place (6 points)</th>
<th>2nd Place (4 points)</th>
<th>3rd Place (2 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originality</td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Marching Quality</td>
<td></td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

This score card for the three schools A, B, and C is incomplete. What is one possible total score for School B?
9. The average of six consecutive even integers is 31. What is the sum of the smallest plus the largest of the integers?

10. \(0.86^2 - 0.84^2 = \)
ANSWERS

Screening Test


Standards Progress Test 1


Standards Progress Test 2


Standards Progress Test 3


Standards Progress Test 4


Standards Progress Test 5


Quarter 1 Test, Form G

1. 12x - 8 2. -5(3 + k) 3. -10.2 4. 4. -5
8
5. 0, {2}, {3}, {5}, {8}, {2, 3}, {2, 5}, {2, 8}, {3, 5}, {3, 8},
{5, 8}, {2, 3, 5}, {2, 3, 8}, {3, 5, 8}, {2, 5, 8}, {2, 3, 5, 8}
6. x = 3.75 7. $14.70 8. c = 12m, where cost is c
and month is m 9. =8
10. Associative Property of Multiplication
11. n ≥ 25 12. x ≤ 5 13. 9 in. 14. 31
15. Distributive Property 16. 0.75t = 16.50; 22
tickets 17. yes 18. x ≥ -3 19. 3 20. k = 5
21. y = 3 22. h = -11 23. $44 24. 0.3 h
25. 14% 26. y > -7 27. n ≥ 1 or n ≤ -5
28. x ≥ 14 or x ≤ -2 29. yes 30. 28

Quarter 2 Test, Form G

1. 

2. 

3. (4, -2)

4. 25p + 18g = 265
   p + g = 12
   private, 5 group
   0.25q + 0.05n = 1.25
5. q + n = 13
   3 quarters, 10 nickels

6.

Population

Time
7. \[
\begin{array}{|c|c|c|}
\hline
x & f(x) = \frac{1}{2}x + 3 & (x, y) \\
\hline
-4 & f(-4) = \frac{1}{2}(-4) + 3 = 5 & (-4, 5) \\
0 & f(0) = \frac{1}{2}(0) + 3 = 3 & (0, 3) \\
4 & f(4) = \frac{1}{2}(4) + 3 = 1 & (4, 1) \\
\hline
\end{array}
\]

25. \( y = \frac{3}{2}x - 3 \)

26. parallel 27. yes; The ordered pairs make the inequality true. 28. nonlinear 29. \(-2x + y = 1\)

30. \( y = 750 + 25x; \$5.63\) per book

8. \( y = 8518 - 223x; 7626 \)

9. \( y + 7 = \frac{1}{3}(x - 2) \)

10. \([37, 17, 63]\) 11. \( E = 3h \) 12. \( c(x) = 20 - 0.79x \)

13. \( y = \frac{5}{6}x \) 14. \( y = -2x \) 15. 18, 21, 24

16. 180, 144, 108

17. \( y = \frac{5}{8}x - \frac{3}{8} \) 18. \( y = \frac{3}{2}x + 3 \) 19. 5 20. \(-\frac{3}{2}\)

21. \((0, 6); (4, 0)\) 22. \( y = \frac{3}{5}x - 5 \)

23. negative correlation

24. 25. \( y = \frac{3}{2}x - 3 \)

26. parallel 27. yes; The ordered pairs make the inequality true. 28. nonlinear 29. \(-2x + y = 1\)

30. \( y = 750 + 25x; \$5.63\) per book
27a.

27b. 4.3 seconds

28. For growth, $b > 1$; for decay, $0 < b < 1$.

29. $(-4, 32)$ and $(3, -17)$

30. $-\frac{27}{32}$

Quarter 4 Test, Form G

1. $\frac{1}{4}$ 2. $\frac{7}{57}$ 3. 102

4.  

5. $[- \frac{2}{-3}, \frac{1}{13}]$ 6. mean = 12; median = 12; mode = 5 7. $\frac{a + 5}{2(a - 5)}$ 8. direct; The constant of variation is 0.045 9. minimum value = 65; maximum value = 97; first quartile = 71.5; median = 79.5; third quartile = 86.5 10. skewed 11. The question does not give respondents the chance to choose one candidate over the other; respondents are steered towards making a choice between two of Candidate A’s policies.

12. 9 13. $\frac{5\sqrt{11} - 5\sqrt{7}}{4}$ 14. $12x\sqrt{3x}$

15. $\frac{25}{16}$ 16. 3, 1 17. vertical asymptote: $x = 3$; horizontal asymptote: $y = 0$

18. The graph will be the same shape, moved up 2 units.

19. $\frac{x + 3}{x(x + 1)}$

20. $3x^2 - 2x - 3$

21. $\frac{x^2 + 4}{(x + 2)(x - 2)}$

22. $\frac{10 - y}{y^2 - y - 20}$

23. 5

24. $-3$ 25. 10 26. 6720 27. 6435 ways

28. 88.1 ft 29. $-6 + 47\sqrt{15}$

30. $\sin L = \frac{MN}{LM}; \tan M = \frac{NL}{MN}$

Mid-Course Test, Form G

1. 220 2. $-\frac{7}{6}$ 3. 648 4. 23.625 5. 40 left-handed students 6. 4.1 7. 83.8 8. 5 9. 0

10. $y \leq -42$ 11. $-2 < d < 2$

12.

13. $x \leq -10$ or $x \geq 4$;

14. $c(k) = 20 - 1.29x$ 15. $\{-4, -5, 7.25\}$

16. $-42$ 17. yes; $-3 > -8$ 18. no solution

19. $x - 32 = 289.14; \$321.14 20. $\frac{2}{3}x = 8; 12$ gallons

21. $2x + 5 = 12; 3.5$ 22. $(c + 2) + 3c = 34$ 38

23. $0.25x \leq 2.20; 8$ gumballs 24. $32\%$ 25. 287

26. 40 million 27. $\frac{1}{3}$ 28. 2 29. $y = \frac{3}{2}x + 1$

30. $y = 18$ 31. $y = \frac{4}{3}x + \frac{17}{9}$ 32. $y = -\frac{1}{3}x$

33. $(2d - 5)(6d + 4)$ 34. $6x^2 - 15$

35.

36. $y = |x + 6|$ 37. 113°F 38. $\$58,200$

39. Distributive Property 40. Mike

41. $(-3.6, 14.4)$ 42. $[2, 4]$ 43. Answers may vary.

Sample: From 0 to 4 min, Luis biked away from his home. From 4 min to 6 min, Luis stopped biking. From 6 min to 9 min, Luis continued biking away from his home but at a higher speed than he traveled during the first 4 min.

44. $x > -27.5$ or $x < 32.5$

45a. $f(x) = 1560x + 32,600$ 45b. $\$41,960$
Final Test, Form G

1. $\frac{2}{3}$, 0.6, $(−0.3)^2$, $−\frac{1}{2}$  
2. $y = \frac{2}{3}x - 2$
3. no; 3 min late  
4. 6 days
5. $\begin{bmatrix} -4 & 0 \\ 3 & 3 \end{bmatrix}$
6. $−8x^2 + 24x$  
7. $5x^3 + 11x^2 − 5x − 4$  
8. $\frac{9}{2}$
9. 3 or 1
10. 2  
11. 13, 3
12. $\frac{4}{3}$, $\frac{5}{2}$
13. $x − 3y = −5$  
14. $4x − 5y = 20$
15. 5  
16. 7
17. $(x + 9)(x − 3)$
18. $(2x + 1)(x^2 − 7)$
19. two
20. $−25$
21. $6\sqrt{5}$
22. $15x^2\sqrt{x}$
23. 11
24. $56x^5y^5$  
25. $\frac{y^2z^3}{3x}$
26. $\frac{1}{2}$
27. 116,280 arrangements
28. $x ≤ −6$
29. $x^3 + 3x^2 + 4x + 12$  
30. $9x^2 + 3x − 20$
31a. $28,090$  
31b. $37590.76$
32. $3.75 \times 10^5$
33. $y ≤ −x + 2$
34. $(11, −3)$
35. $\left(\frac{8}{3}, \frac{1}{3}\right)$
36. $y = 3x$ and $3x + 2y = 18$; book: $2.00; CD: $6.00
37. 400  
38. $15,544$
39. 623 books
40. mean: 90.6; median: 90; mode: 89
41. $x + (x + 1) + (x + 2) = 219$; 72, 73, 74
42. $53.24 ≤ 26.99 + 0.07x ≤ 132$; 375 to 1500 minutes
43. No, $10^2 + 18^2 ≠ 22^2$.
44. $\frac{2(x − 1)}{x + 3}$
45. $3x^3 + 2x^2 + 4 + \frac{x + 1}{2x^2 − 3}$
46. $y = \frac{8}{15}x$
47. $xy = 120$
48. $r = \sqrt{\frac{m_1m_2}{F_g}}$
49. $A′ = \{30, 40\}$
50. $−1.6, 1.6$

Quarter 1 Test, Form K

1. $3n − 2$  
2. $6(2 + x)$  
3. $\frac{3}{4}$
4. $\{2\}, \{10\}, \{2, 10\}$
5. $\{2\}, \{10\}$
6. $\frac{6}{7}$
7. $\$54$
8. $h = 2d$, where $h$ represents height and $d$ represents day
9. 4  
10. Associative Property of Multiplication
11. $x < 42$
12. $x ≥ −10$
13. 2 in.  
14. 10  
15. Distributive Property
16. $72 = 24p$; 3 pencils
17. yes
18. $x ≤ 2$
19. 7  
20. $w = 3$
21. $t = 1$
22. $x = 1$
23. $\frac{20}{27}$
24. 30 mi  
25. 25%  
26. $s ≥ 5$
27. $n ≥ −6$ or $n ≤ −10$
28. $r < 9$ or $r > −3$
29. no
30. $x = 4.5$

Quarter 2 Test, Form K

1. $(1, 2)$
6. \[ f(x) = -2x + 1 \] 

7. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
<th>( (x, y) )</th>
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</thead>
<tbody>
<tr>
<td>-1</td>
<td>-2(-1) + 1</td>
<td>(-1, 3)</td>
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<tr>
<td>0</td>
<td>-2(0) + 1</td>
<td>(0, 1)</td>
</tr>
<tr>
<td>1</td>
<td>-2(1) + 1</td>
<td>(1, -1)</td>
</tr>
</tbody>
</table>

8. \( y = 318 - 23x \); 249  
9. \( y + 4 = -3(x - 1) \)
10. -23, 7, 19  
11. \( f(x) = 20l \), where \( l \) represents the number of lawns  
12. \( m(x) = 8 - 0.25x \)
13. \( y = \frac{5}{6}x \)  
14. \( y = -2x \)  
15. 3, 5, 8  
16. 12; 69, 81
17. \( y = 2x + 3 \)  
18. \( y = 2x + 4 \)  
19. 2  
20. -1
21. (3, 0); (0, 3)  
22. \( y = -\frac{2}{5}x - 4 \)
23. 

24. negative correlation

25. \( y = 2x - 1 \)  
26. perpendicular  
27. yes; \( 8 \geq 7 \)
28. nonlinear  
29. \( x - y = 0 \)
30. \( y = 900 + 42x; \$3.00 \) per book

Quarter 3 Test, Form K

1. \( x^2 \)  
2. \( 12x^5 \)  
3. \( 4x^4y^6 \)  
4. \( 7.402 \times 10^6 \)
5. \( 2.36 \times 10^2, 2.36 \times 10^3, 23.6 \times 10^3 \)  
6. 3, 6, 12

8. 9.2, -1.2  
9. 4  
10. \( y = 2x \); exponential 
11. \( 5\sqrt{3} \) ft  
12. \((x + 3)(x - 2) = 0; x = -3 \) or 2 
13. 9  
14. (3, -5)  
15. two real solutions 
16. \( 10x^2 - 20x + 2 \)  
17. \( -2x^2 - 11x + 2 \)
18. \( 24x^4 - 40x^3 \)  
19. \( x^3 + 10x + 24 \)
20. \((x + 11)(x + 1)\)  
21. \((x + 11)(x - 11)\) 
22. \(3x^3 + 4x + 2\)  
23. \(3(x + 2)(x - 4)\)
24. \((2x + 3)(x - 7)\)
25. 4
26. 

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ANSWERS (CONTINUED)

27b. 5.6 s
28. exponential decay
29. (−1, 1) and (−2, 4)
30. −16

Quarter 4 Test, Form K
1. 3/8
2. 1/28
3. 87

4. [0 2/4 9]
5. mean = 9; median = 10; mode = 6
6. 38
7. 1/2
8. inverse; The time decreases as the number of volunteers increases.
9. minimum = 70; first quartile = 73; median = 80; third quartile = 85; maximum = 92
10. skewed
11. The people closest to the road might be less likely to be in favor of it when compared with people who live farther away.
12. 5
13. \(\sqrt{5} - \frac{\sqrt{3}}{2}\)
14. 4n√2n
15. 1/4
16. 6, 1
17. x = 1;

18. The graph will be the same shape, but it will move down 3 units.
19. \(\frac{1}{4}\)
20. \(x^2 + 3x + 5\)

21. \(\frac{x^2 - 3x + 2}{x^2 - 9}\)
22. \(n^2 + 2n - 10\)
23. −12
24. −2
25. 10
26. 60
27. 30
28. 74.5 ft
29. 18 − 3\(\sqrt{10}\)
30. \(\sin A = \frac{3}{5}\) \(\tan B = \frac{4}{3}\)

Mid-Course Test, Form K
1. 11
2. \(\frac{3}{4}\)
3. −12
4. 4
5. 10
6. −17
7. 30
8. 4
9. 2
10. \(y > 2\)
11. \(1 < x < 4\)
12. \(x < 6\)
13. \(x \geq −5\)
14. \(x \geq 4\)
15. \(c(x) = 1.39x\)
16. 128, 141
17. yes; 6 ≥ −2
18. infinitely many solutions
19. $61
20. 0.25 gal
21. $7
22. 10
23. 4x + 14
24. \(x = 0.25(80)\)
25. 0.85(300) = x; 255
26. 54.2%
27. \(\frac{1}{2}\)
28. 6
29. \(y = 2x\)
30. \(x = 5\)
31. 5
32. \(y = 3x\)
33. \(6 + 6x\)
34. \(4(x + 3)\)
35. 

36. 3 units up; The point (0, 0) becomes (0, 3) with the new equation.
37. 6 ft
38. $60
39. Distributive Property
40. Brand B
41. (2, 12)
42. \{1, 2, 3, 4, 6, 8\}
43. The speed of the object is zero.
44. −4 < x < 4
45. \(f(x) = 5x + 50\)
46. 6
47. \(y = 2x + 6\)
48. \(y = 3x\)
49. 50% increase
50. The lines are perpendicular.

Final Test, Form K
1. \(\frac{1}{10}\)
2. 0.6
3. 62 mi/h
4. 15 h
5. \(\begin{bmatrix} 2 & 2 \\ 1 & 1 \end{bmatrix}\)
6. $x^2 + 7x$  7. $x^2 + 5x + 8$  8. 7  9. 4 or −1  10. 2  11. −7, 1  12. −2, −4  13. $−3x + y = −2$  14. $3x + 4y = −12$  15. 11  16. 32  17. $(x + 6)(x + 2)$  18. $(x + 3)(x + 2)$  19. two  20. 16, 20  21. $3\sqrt{2}$  22. $4x^2$  23. 8  24. $8x^5$  25. $3xy^4$  26. $\frac{1}{2}$  27. 11,880 arrangements  28. $x < 5$  29. $x^3 + 2x^2 + x + 2$  30. $2x^2 + x - 6$  31. 4000  32. $4.5 \times 10^4$

33.

34. (5, 2)  35. (3, 5)  36. 16 cars and 8 trucks  37. 5  38. $32.40$  39. 7 months  40. mean: 70; median: 70; mode: 73  41. $x + (x + 2) = 30; 14, 16$  42. $37 \leq 25 + 2x \leq 53; 6$ to 14 rides  43. 20  44. $\frac{1}{6(x + 3)}$  45. $x + 3 + \frac{2}{x + 1}$  46. $y = 2x$

47. $xy = 8$  48. $r = \sqrt{\frac{A}{\pi}}$

49. $\{\emptyset\}, \{f\}, \{g\}, \{f, g\}$

50.

End of Course Algebra 1 Practice Test

Multiple Choice
1. A B C D E
2. A B C D E
3. A B C D E
4. A B C D E
5. A B C D E
6. A B C D E
7. A B C D E
8. A B C D E
9. A B C D E
10. A B C D E
11. A B C D E
12. A B C D E
13. A B C D E
14. A B C D E
15. A B C D E
16. A B C D E
17. A B C D E
18. A B C D E
19. A B C D E
20. A B C D E
21. A B C D E
22. A B C D E
23. A B C D E
24. A B C D E
25. A B C D E
26. A B C D E
27. A B C D E
28. A B C D E
29. A B C D E
30. A B C D E
31. A B C D E
32. A B C D E

Student-Produced Responses

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3.  
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6.  
   | 4 0 0 |
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7.  
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8.  
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   |---|---|
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9.  
   | 6 2 |
   |---|---|
   |   |   |

10.  
    | . 0 3 4 |
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Note: 12 is also a correct response for problem 8.
Multiple Choice

1. A B C D E
2. A B C D E
3. A B C D E
4. A B C D E
5. A B C D E
6. A B C D E
7. A B C D E
8. A B C D E
9. A B C D E
10. A B C D E
11. A B C D E
12. A B C D E
13. A B C D E
14. A B C D E
15. A B C D E
16. A B C D E
17. A B C D E
18. A B C D E
19. A B C D E
20. A B C D E
21. A B C D E
22. A B C D E
23. A B C D E
24. A B C D E
25. A B C D E
26. A B C D E
27. A B C D E
28. A B C D E
29. A B C D E
30. A B C D E
31. A B C D E
32. A B C D E

Student-Produced Responses

1. [Answer Sheet]
2. [Answer Sheet]
3. [Answer Sheet]
4. [Answer Sheet]
5. [Answer Sheet]
6. [Answer Sheet]
7. [Answer Sheet]
8. [Answer Sheet]
9. [Answer Sheet]
10. [Answer Sheet]