SEMESTER ONE EXAM

Multiple Choice
Identify the choice that best completes the statement or answers the question.

Which algebraic expression models the given word phrase?

1. 40 fewer than a number \( t \)
   a. \(-40t\)  
   b. \(t + 40\)  
   c. \(40 - t\)  
   d. \(t - 40\)

2. 5 times the sum of \( a \) and \( b \)
   a. \(5a + b\)  
   b. \(5(a + b)\)  
   c. \(a + b\)  
   d. \(5(a - b)\)

What is the solution of the following one-step equation?

3. \(x + 5 = 10\)
   a. \(x = -15\)  
   b. \(x = 15\)  
   c. \(x = 5\)  
   d. \(x = -5\)

4. \(x - 3 = 4\)
   a. \(x = 7\)  
   b. \(x = 1\)  
   c. \(x = -7\)  
   d. \(x = -1\)

Is the relation a function?

5. \{(14, 9), (15, 8), (8, 7), (1, 9), (15, 2)\}
   a. yes  
   b. no

6. Use the vertical-line test to determine which graph represents a function.
   a. 
   c. 
What is the slope of the line that passes through the given points?

7. (6, 2) and (7, 4)
   a. -2  c. 1
   b. 1  d. 2

8. (8, 7) and (5, 7)
   a. 0  c. undefined
   b. 13  d. 14

What is an equation of the line in slope intercept form?

9. \( m = 2 \) and the y-intercept is (0, 7)
   a. \( y = 7x + 2 \)  c. \( y = 2x + 7 \)
   b. \( y = 2x - 7 \)  d. \( y = -7x + 2 \)

10. \( y = -2x - 4 \)  c. \( y = -4x + 2 \)
    b. \( y = -4x - 2 \)  d. \( y = 2x - 4 \)
Write the equation in slope-intercept form. What are the slope and y-intercept?

11. \(-11x + 9y = -12\)
   a. \(y = \frac{-11}{9}x - \frac{4}{3};\)
      slope: \(\frac{-11}{9}\); y-intercept: \(-\frac{4}{3}\)
   b. \(y = \frac{-11}{9}x + \frac{4}{3};\)
      slope: \(\frac{-11}{9}\); y-intercept: \(\frac{4}{3}\)
   c. \(y = \frac{11}{9}x - \frac{4}{3};\)
      slope: \(\frac{11}{9}\); y-intercept: \(-\frac{4}{3}\)
   d. \(y = \frac{11}{9}x + \frac{4}{3};\)
      slope: \(\frac{11}{9}\); y-intercept: \(\frac{4}{3}\)

12. \(-3x + 1y = -10\)
   a. \(y = -3x + 10;\)
      slope: 3; y-intercept: 10
   b. \(y = 3x - 10;\)
      slope: 3; y-intercept: -10
   c. \(y = -3x + 10;\)
      slope: 3; y-intercept: 10
   d. \(y = -3x - 10;\)
      slope: 3; y-intercept: 10

What is the graph of the equation?

13. \(-5x + y = -4\)
   a. 
   b. 
   c. 
   d. 
14. \(2x - y = 5\)

a. 

b. 

c. 

d.
Write an equation of the line, in point-slope form, that passes through the two given points.

15. points: \((-2, 10), (10, -14)\)

   a. \(y - 2 = -\frac{1}{2}(x + 10)\)
   b. \(y - 10 = -\frac{1}{2}(x + 2)\)
   c. \(y - 10 = -2(x + 2)\)
   d. \(y - 2 = -2(x - 10)\)

16. points: \((-3, 3), (9, -3)\)

   a. \(y - 3 = -\frac{1}{2}(x + 3)\)
   b. \(y - 3 = -2(x + 3)\)
   c. \((y + 3) = -2(x - 3)\)
   d. \((y + 3) = -\frac{1}{2}(x - 3)\)

What is an equation of the line, in point-slope form, that passes through the given point and has the given slope?

17. point: \((6, -7); \text{slope: 4}\)

   a. \(y - 7 = 4(x - 6)\)
   b. \(y + 7 = 4(x - 6)\)
   c. \(y + 7 = 4(x + 6)\)
   d. \(y - 7 = 4(x + 6)\)

What is the equation of the given line in standard form? Use integer coefficients.

18. \(y = -6.9x + 5.1\)

   a. \(-69x + 10y = 51\)
   b. \(69x + 10y = 51\)
   c. \(69x + 10y = -51\)
   d. \(-69x + 10y = -51\)

What are the intercepts of the equation? Graph the equation.

19. \(-3x + 4y = -12\)

   a. \(x\)-intercept: \((-3, 0)\)
   b. \(y\)-intercept: \((0, 4)\)
   c. \(x\)-intercept: \((4, 0)\)
   d. \(y\)-intercept: \((0, -3)\)
What is the equation of the line in slope-intercept form?

20. the line parallel to \( y = 8x - 8 \) through (5, 2)
   a. \( y = 8x - 38 \)
   b. \( y = 8x - 42 \)
   c. \( y = -8x - 38 \)
   d. \( y = -8x - 38 \)

21. the line perpendicular to \( y = \frac{1}{3}x + 5 \) through (2, 1)
   a. \( y = \frac{1}{3}x + 7 \)
   b. \( y = -3x + 7 \)
   c. \( y = 3x + 7 \)
   d. \( y = -\frac{1}{3}x + 7 \)

22. the line parallel to \( y = 4x + 8 \) through (3, 1)
   a. \( y = 4x - 11 \)
   b. \( y = -\frac{1}{4}x - 11 \)
   c. \( y = 4x - 13 \)
   d. \( y = -4x - 11 \)
23. the line perpendicular to \( y = \frac{1}{4}x - 2 \) through (8, 6)
   a. \( y = -\frac{1}{4}x + 38 \)
   b. \( y = \frac{1}{4}x + 38 \)
   c. \( y = -4x + 38 \)
   d. \( y = 4x + 38 \)

Make a scatter plot and describe the correlation.

24. The table lists average monthly temperatures and electricity cost for a Texas home in 2008. The table displays the values rounded to the nearest whole number. Make a scatter plot. How would you describe the correlation?

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Temp (°F)</th>
<th>Electricity Bill ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>55</td>
<td>156</td>
</tr>
<tr>
<td>February</td>
<td>53</td>
<td>158</td>
</tr>
<tr>
<td>March</td>
<td>57</td>
<td>154</td>
</tr>
<tr>
<td>April</td>
<td>63</td>
<td>157</td>
</tr>
<tr>
<td>May</td>
<td>69</td>
<td>160</td>
</tr>
<tr>
<td>June</td>
<td>74</td>
<td>162</td>
</tr>
<tr>
<td>July</td>
<td>78</td>
<td>167</td>
</tr>
<tr>
<td>August</td>
<td>83</td>
<td>173</td>
</tr>
</tbody>
</table>

a. As temperature increases, the electricity cost decreases; there is a positive correlation.

b. 

c. As temperature increases, the electricity cost increases; there is a negative correlation.
As temperature increases, the electricity cost increases; there is a positive correlation.

As temperature increases, the cost of electricity decreases; there is a negative correlation.

25. A nationwide club begins a chapter near you. You research the membership of the club over the past few decades. The table shows your data. What is the equation for a line of best fit? How many members would you expect there to be in the year 2019?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership</td>
<td>5,100</td>
<td>6,500</td>
<td>8,100</td>
<td>10,500</td>
<td>12,000</td>
<td>12,600</td>
</tr>
</tbody>
</table>

a. \( y = 5,100x + 329.17; \) 27,438  
   c. \( y = 329.17x + 5,100; \) 17,938

b. \( y = 329.17x + 5,100; \) 27,438  
   d. \( y = 5,100x + 329.17; \) 17,938

26. How are the functions \( y = x \) and \( y = x + 5 \) related? How are their graphs related?

a. Each output for \( y = x + 5 \) is 5 less than the corresponding output for \( y = x \). The graph of \( y = x + 5 \) is the graph of \( y = x \) translated down 5 units.

b. Each output for \( y = x + 5 \) is 5 more than the corresponding output for \( y = x \). The graph of \( y = x + 5 \) is the graph of \( y = x \) translated up 5 units.

c. Each output for \( y = x + 5 \) is 5 more than the corresponding output for \( y = x \). The graph of \( y = x + 5 \) is the graph of \( y = x \) translated down 5 units.

d. Each output for \( y = x + 5 \) is 5 less than the corresponding output for \( y = x \). The graph of \( y = x + 5 \) is the graph of \( y = x \) translated up 5 units.

27. If a function, \( f(x) \) is shifted to the left four unit(s), what function represents the transformation?

a. \( f(x - 4) \)  
   c. \( f(x + 4) \)

b. \( f(x) - 4 \)  
   d. \( f(x) + 4 \)

**What is the equation of the absolute value function?**

28.
Assume that $x$ and $y$ are whole numbers. Use a table to solve the system of inequalities.

___ 29. \[
\begin{align*}
  x + y &> 1 \\
  2x + 3y &\leq 7
\end{align*}
\]

a. (0, 1) (0, 2) (1, 1) (2, 1) 

b. (0, 2) (1, 1) (2, 1) 

c. (0, 2) (1, 1) 

d. (0, 1) (0, 2) (1, 1)

___ 30. \[
\begin{align*}
  x + y &\geq 5 \\
  2x + 2y &\leq 10
\end{align*}
\]

a. all $x$ and $y$ values for which $y = -x + 5$ 

b. all $x$ and $y$ values for which $y = -x - 5$ 

c. all $x$ and $y$ values for which $y = x + 5$ 

d. all $x$ and $y$ values for which $y = x - 5$

What is the solution of the system?

___ 31. \[
\begin{align*}
  4x + 4y &= -12 \\
  4x + 5y &= -8
\end{align*}
\]

a. (7, -4) 

b. (-7, 4) 

c. (7, 4) 

d. (4, -7)

___ 32. \[
\begin{align*}
  -8x + y &= -23 \\
  4x + y &= 1
\end{align*}
\]

a. (-7, 2) 

b. (-2, 7) 

c. (-2, -7) 

d. (2, -7)

___ 33. \[
\begin{align*}
  2x + 6y &= 38 \\
  5x - y &= 15
\end{align*}
\]

a. (4, 5) 

b. (4, 5) 

c. (5, 4)
b. \((-4, -5)\) 

d. \((-4, 5)\)

**What is the solution of the system of equations?**

\[
\begin{cases}
5x + 3y + 2z = -4 \\
-5x - 4y - 2z = 7 \\
4x + 2y + 2z = -2 
\end{cases}
\]

___ 34. 

\[
\begin{cases}
-5x + y - 5z = 1 \\
2x + 2y - 3z = -13 \\
3x - y - 5z = -25 
\end{cases}
\]

___ 35. 

___ 36. Which is the graph of \(y = -2(x - 2)^2 - 4?\)

a. 

b. 

c. 

d. 

___ 37. A biologist took a count of the number of migrating waterfowl at a particular lake, and recounted the lake’s population of waterfowl on each of the next six weeks.
Find a quadratic function that models the data as a function of \(x\), the number of weeks. Use the model to estimate the number of waterfowl at the lake on week 8.

\[ P(x) = 25x^2 - 25x + 600; 1,650 \text{ waterfowl} \]

\[ P(x) = 30x^2 + 25x + 550; 2,195 \text{ waterfowl} \]

\[ P(x) = 25x^2 - 25x + 600; 2,000 \text{ waterfowl} \]

\[ P(x) = 30x^2 + 25x + 550; 2,670 \text{ waterfowl} \]

38. The table shows a meteorologist's predicted temperatures for an April day in Washington D.C. Use quadratic regression to find a quadratic model for this data. (Use the 24-hour clock to represent times after noon.)

<table>
<thead>
<tr>
<th>Time</th>
<th>Predicted Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 A.M.</td>
<td>51.17</td>
</tr>
<tr>
<td>10 A.M.</td>
<td>62.7</td>
</tr>
<tr>
<td>12 P.M.</td>
<td>70.13</td>
</tr>
<tr>
<td>2 P.M.</td>
<td>73.48</td>
</tr>
<tr>
<td>4 P.M.</td>
<td>72.75</td>
</tr>
<tr>
<td>6 P.M.</td>
<td>67.92</td>
</tr>
</tbody>
</table>

\[ a. -0.511x^2 - 14.961x - 35.814 \]

\[ b. -0.011x^2 + 15.961x - 39.814 \]

\[ c. -1.011x^2 + 13.961x - 31.814 \]

\[ d. -0.511x^2 + 14.961x - 35.814 \]

39. The table shows a meteorologist's predicted temperatures for an April day in Washington D.C starting at 8 A.M. Use a quadratic model of this data to predict the high temperature for the day. At what time does the high temperature occur?

<table>
<thead>
<tr>
<th>Time</th>
<th>Predicted Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 A.M.</td>
<td>48.91</td>
</tr>
<tr>
<td>10 A.M.</td>
<td>60.04</td>
</tr>
<tr>
<td>12 P.M.</td>
<td>67.11</td>
</tr>
<tr>
<td>2 P.M.</td>
<td>70.11</td>
</tr>
<tr>
<td>4 P.M.</td>
<td>69.05</td>
</tr>
<tr>
<td>6 P.M.</td>
<td>63.92</td>
</tr>
</tbody>
</table>

\[ a. \text{The predicted high temperature is 79.22 degrees Fahrenheit occurring at 2:29 P.M.} \]

\[ b. \text{The predicted high temperature is 70.22 degrees Fahrenheit occurring at 2:29 P.M.} \]

\[ c. \text{The predicted high temperature is 70.22 degrees Fahrenheit occurring at 3:29 P.M.} \]

\[ d. \text{The predicted high temperature is 79.22 degrees Fahrenheit occurring at 3:29 P.M.} \]

What is the number of real solutions?

40. \(-x^2 + 9x + 7 = 0\)
41. \(8x^2 - 11x = -3\)
   a. one real solution
   b. no real solutions
   c. two real solutions
   d. cannot be determined

42. \(x^2 = -7x + 7\)
   a. one solution
   b. no real solutions
   c. two solutions
   d. cannot be determined

43. \(-4x^2 - 4 = 8x\)
   a. one solution
   b. two solutions
   c. no real solutions
   d. cannot be determined

44. \(3x^2 - x - 10 = 0\)
   a. no real solutions
   b. one solution
   c. cannot be determined
   d. two solutions

45. Identify the graph of \(-2i\).
   a. [Graph 1]
   b. [Graph 2]
What is the solution of the system of inequalities?

\[
\begin{align*}
  y &\geq x^2 + 2x + 2 \\
  y &< -x^2 - 4x - 2
\end{align*}
\]
47. \[
\begin{align*}
    y &< x^2 + 6x + 11 \\
    y &\geq -x^2 - 8x - 13
\end{align*}
\]
Consider the leading term of each polynomial function. What is the end behavior of the graph?

48. $-3x^3 - x$
   a. The leading term is $-3x^3$. Since $n$ is odd and $a$ is negative, the end behavior is down and down.
   b. The leading term is $-3x^3$. Since $n$ is odd and $a$ is negative, the end behavior is up and up.
   c. The leading term is $-3x^3$. Since $n$ is odd and $a$ is negative, the end behavior is up and down.
   d. The leading term is $-3x^3$. Since $n$ is odd and $a$ is negative, the end behavior is down and up.

49. $5x^8 - 2x^7 - 8x^6 + 1$
   a. The leading term is $5x^8$. Since $n$ is even and $a$ is positive, the end behavior is down and up.
   b. The leading term is $5x^8$. Since $n$ is even and $a$ is positive, the end behavior is up and down.
   c. The leading term is $5x^8$. Since $n$ is even and $a$ is positive, the end behavior is up and up.
   d. The leading term is $5x^8$. Since $n$ is even and $a$ is positive, the end behavior is down and down.

50. $-3x^5 + 9x^4 + 5x^3 + 3$
   a. The leading term is $-3x^5$. Since $n$ is odd and $a$ is negative, the end behavior is up and up.
   b. The leading term is $-3x^5$. Since $n$ is odd and $a$ is negative, the end behavior is down and down.
   c. The leading term is $-3x^5$. Since $n$ is odd and $a$ is negative, the end behavior is up and down.
   d. The leading term is $-3x^5$. Since $n$ is odd and $a$ is negative, the end behavior is down and up.

51. What is the graph of $y = \frac{1}{4} x^3$
52. Graph \( y = 3(x + 2)^3 - 3 \) and describe the end behavior.

a. The end behavior is up and down.

b. The end behavior is up and down.
c. The end behavior is down and up.

d. The end behavior is up and down.
53. Graph \( y = 2x - x^3 \). How many turning points are there?

- a. There are two turning points.
- b. There are two turning points.
- c. There are no turning points.
- d. There are no turning points.

What is the degree of the polynomial that generates the given data?
54. 

<table>
<thead>
<tr>
<th></th>
<th>x</th>
<th>–6</th>
<th>–2</th>
<th>0</th>
<th>2</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>–726</td>
<td>34</td>
<td>0</td>
<td>18</td>
<td>582</td>
<td></td>
</tr>
</tbody>
</table>

a. cubic model  
b. quadratic model  
c. linear model  
d. none of these

55. 

<table>
<thead>
<tr>
<th></th>
<th>x</th>
<th>–7</th>
<th>–3</th>
<th>0</th>
<th>3</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1344</td>
<td>108</td>
<td>0</td>
<td>3</td>
<td>126</td>
<td>1442</td>
</tr>
</tbody>
</table>

a. cubic model  
b. linear model  
c. quadratic model  
d. none of these

56. What is a cubic polynomial function in standard form with zeros –4, –5, and 4?

a. \( f(x) = x^3 - 5x^2 - 16x + 20 \)  
b. \( f(x) = x^3 - 5x^2 + 16x - 80 \)  
c. \( f(x) = x^3 - 5x^2 + 16x + 80 \)  
d. \( f(x) = x^3 + 5x^2 - 16x - 80 \)

57. What is a quartic polynomial function in standard form with zeros –2, 4, 4, and 3?

a. \( g(x) = x^4 + 9x^3 - 18x^2 - 32x - 96 \)  
b. \( g(x) = x^4 - 9x^3 + 18x^2 + 32x - 96 \)  
c. \( g(x) = x^4 - 9x^3 + 6x^2 + 10x - 96 \)  
d. \( g(x) = x^4 + 9x^3 + 6x^2 - 32x - 96 \)

**What are the zeros of the function? What are their multiplicities?**

58. \( f(x) = x^4 - 4x^3 + 3x^2 \)

a. the numbers –1 and –3 are zeros of multiplicity 2; the number 0 is a zero of multiplicity 1  
b. the number 0 is a zero of multiplicity 2; the numbers 1 and 3 are zeros of multiplicity 1  
c. the numbers 0 and 1 are zeros of multiplicity 2; the number 3 is a zero of multiplicity 1  
d. the number 0 is a zero of multiplicity 2; the numbers –1 and –3 are zeros of multiplicity 1

59. \( f(x) = 4x^3 - 12x^2 - 16x \)

a. the numbers 1, –4, and 0 are zeros of multiplicity 2  
b. the numbers –1, 4, and 0 are zeros of multiplicity 2  
c. the numbers –1, 4, and 0 are zeros of multiplicity 1  
d. the numbers 1, –4, and 0 are zeros of multiplicity 1

60. Determine which binomial is not a factor of \( 4x^4 - 21x^3 - 46x^2 + 219x + 180 \).

a. \( x + 4 \)  
b. \( x + 3 \)  
c. \( x - 5 \)  
d. \( 4x + 3 \)

61. Is \( (x - 2) \) a factor of \( P(x) = x^3 + 2x^2 - 6x - 4 \)? If it is, write \( P(x) \) as a product of two factors.

a. yes: \( P(x) = (x + 2)(x^2 + 4x + 2) \)  
b. yes: \( P(x) = (x - 2)(x^2 - 4x + 2) \)  
c. yes: \( P(x) = (x + 2)(x^2 + 4x + 2) \)  
d. \( (x - 2) \) is not a factor of \( P(x) \)
\[ P(x) = (x - 2)(x^2 + 4x + 2) \]

For each set of data, which model seems more likely to represent each set of data over time?

___ 62.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average salary of top 5% of Americans (thousands $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>135</td>
</tr>
<tr>
<td>1999</td>
<td>156</td>
</tr>
<tr>
<td>2003</td>
<td>154</td>
</tr>
</tbody>
</table>

a. cubic  
b. quadratic  
c. quartic  
d. linear

What is the simplest form of the expression?

___ 63. \( \sqrt{20} + \sqrt{45} - \sqrt{5} \)

a. \( 4\sqrt{5} \)  
b. \( 6\sqrt{5} \)  
c. \( 13\sqrt{5} \)  
d. \( 5\sqrt{5} \)

___ 64. \( \frac{2}{3}\sqrt{48} + \frac{3}{3}\sqrt{2058} - \frac{3}{3}\sqrt{750} \)

a. \( 4\sqrt[3]{6} \)  
b. \( 14\sqrt[3]{6} \)  
c. \( 2.8\sqrt[3]{6} \)  
d. \( 9\sqrt[3]{6} \)

Simplify.

___ 65. \( \frac{1}{16} \)

a. \( 16^2 \)  
b. \( 4 \)  
c. \( \sqrt{16^2} \)  
d. \( 16 \)

What is the simplest form of the number?

___ 66. \( \sqrt{2\left(\frac{8}{\sqrt{2}}\right)} \)

a. \( 1024 \)  
b. \( \frac{5}{2^8} \)  
c. \( \frac{5}{2^5} \)  
d. \( \frac{1}{2^{10}} \)

___ 67. \( 49^{-1.5} \)
a. \[ \frac{1}{343} \]  

b. \[ -73.5 \]  
c. \[ \frac{1}{505} \]  
d. \[ -47.5 \]  

68. \( -27^\frac{2}{3} \)  
a. \[ 9 \]  
b. \[ 57 \]  
c. \[ -28 \]  
d. \[ -18 \]  

69. Divide \(-3x^3 - 2x^2 - x - 2\) by \(x - 2\).  
a. \(-3x^2 + 4x + 15, R 32\)  
b. \(-3x^2 + 4x + 15\)  
c. \(-3x^2 - 8x - 17\)  
d. \(-3x^2 - 8x - 17, R -36\)  

70. Divide \(x^3 + x^2 - x + 2\) by \(x + 4\).  
a. \(x^2 - 3x + 11, R -42\)  
b. \(x^2 - 3x + 11\)  
c. \(x^2 + 5x - 13\)  
d. \(x^2 + 5x - 13, R 46\)  

71. Use the Rational Root Theorem to list all possible rational roots of the polynomial equation \(x^3 - 4x^2 + 7x - 8 = 0\). Do not find the actual roots.  
a. \(-8, -1, 1, 8\)  
b. \(-8, -4, -2, -1, 1, 2, 4, 8\)  
c. \(1, 2, 4, 8\)  
d. no possible roots  

Find the roots of the polynomial equation.  

72. \(x^3 - 2x^2 + 10x + 136 = 0\)  
a. \(3 \pm 5i, -4\)  
b. \(3 \pm 5i, -4\)  
c. \(-3 \pm i, 4\)  
d. \(-3 \pm i, 4\)  

How many roots do the following equations have?  

73. \(2x^4 - x^3 - 12x^2 - 25x + 5 = 0\)  
a. \(2\)  
b. \(3\)  
c. \(4\)  
d. \(5\)  

Use Pascal’s Triangle to expand the binomial.  

74. \((a - 3)^6\)  
a. \(a^6 - 6a^5 + 15a^4 - 20a^3 + 15a^2 - 6a + 1\)  
b. \(a^6 + 18a^5 + 135a^4 + 540a^3 + 1215a^2 + 1458a + 729\)  
c. \(a^6 + 6a^5 + 15a^4 + 20a^3 + 15a^2 + 6a + 1\)  
d. \(a^6 - 18a^5 + 135a^4 - 540a^3 + 1215a^2 - 1458a + 729\)  

Use the Binomial Theorem to expand the binomial.  

75. What is the fourth term of \((a + 4b)^3\)?  
a. \(-b^3\)  
b. \(-64b^3\)  
c. \(b^3\)  
d. \(64b^3\)  

76. What is the second term of \((8v + 5)^3\)?
a. $40s^4$
b. $40s^4y$
c. $320s^4y$
d. $-5s^4y$

What is the simplest form of the product?

___ 77. $\sqrt{50x^2y^7} \cdot \sqrt{6xy^4}$
a. $2x^4y^6\sqrt{75y}$
b. $10x^4y^5\sqrt{3y}$
c. $5x^4y^6\sqrt{12}$
d. $30x^4y^5\sqrt{y}$

___ 78. $\frac{\sqrt{6x^8y^9}}{\sqrt{5x^2y^4}}$
a. $x^3y^2\sqrt{30y}$
b. $\frac{\sqrt{30x^{10}y^{13}}}{5x^2y^4}$
c. $5x^3y^2\sqrt{30y}$
d. none of these

What is the product of the radical expression?

___ 79. $(7 - \sqrt{2})(8 + \sqrt{2})$
a. $54 + 56\sqrt{2}$
b. $54 - \sqrt{2}$
c. $13 + 15\sqrt{2}$
d. $58 + 56\sqrt{2}$

How can you write the expression with rationalized denominator?

___ 80. $\frac{\sqrt{3} - \sqrt{6}}{\sqrt{3} + \sqrt{6}}$
a. $\frac{-1 - 2\sqrt{18}}{3}$
b. $\frac{-3 - 2\sqrt{18}}{9}$
c. $-3 + 2\sqrt{2}$
d. $9 - 2\sqrt{18}$
SEMESTER ONE EXAM

Answer Section

MULTIPLE CHOICE

1. **ANS:** D  **PTS:** 1  **DIF:** L2  **REF:** 1-3 Algebraic Expressions
   **OBJ:** 1-3.1 To evaluate algebraic expressions
   **NAT:** CC A.SSE.1.a| N.1.d| N.3.a| N.3.b| A.3.b| A.3.d  **STA:** AL A2.6b
   **TOP:** 1-3 Problem 1 Modeling Words With an Algebraic Expression

2. **ANS:** B  **PTS:** 1  **DIF:** L3  **REF:** 1-3 Algebraic Expressions
   **OBJ:** 1-3.1 To evaluate algebraic expressions
   **NAT:** CC A.SSE.1.a| N.1.d| N.3.a| N.3.b| A.3.b| A.3.d  **STA:** AL A2.6b
   **TOP:** 1-3 Problem 1 Modeling Words With an Algebraic Expression

3. **ANS:** C  **PTS:** 1  **DIF:** L2  **REF:** 1-4 Solving Equations
   **OBJ:** 1-4.1 To solve equations
   **NAT:** CC A.CED.1| CC A.CED.4| A.2.a| A.4.c
   **TOP:** 1-4 Problem 1 Solving a One-Step Equation
   **KEY:** equation | solution of an equation | inverse operation

4. **ANS:** A  **PTS:** 1  **DIF:** L2  **REF:** 1-4 Solving Equations
   **OBJ:** 1-4.1 To solve equations
   **NAT:** CC A.CED.1| CC A.CED.4| A.2.a| A.4.c
   **TOP:** 1-4 Problem 1 Solving a One-Step Equation
   **KEY:** equation | solution of an equation | inverse operation

5. **ANS:** B  **PTS:** 1  **DIF:** L2  **REF:** 2-1 Relations and Functions
   **OBJ:** 2-1.2 To identify functions
   **NAT:** CC F.IF.1| CC F.IF.2| A.1.g| A.1.i| A.2.b| A.3.f
   **STA:** AL A2.3a  **TOP:** 2-1 Problem 3 Identifying Functions
   **KEY:** function | relation

6. **ANS:** B  **PTS:** 1  **DIF:** L2  **REF:** 2-1 Relations and Functions
   **OBJ:** 2-1.2 To identify functions
   **NAT:** CC F.IF.1| CC F.IF.2| A.1.g| A.1.i| A.2.b| A.3.f
   **STA:** AL A2.3a  **TOP:** 2-1 Problem 4 Using the Vertical-Line Test
   **KEY:** vertical-line test | function

7. **ANS:** D  **PTS:** 1  **DIF:** L2  **REF:** 2-3 Linear Functions and Slope-Intercept Form
   **OBJ:** 2-3.1 To graph linear equations
   **NAT:** CC A.CED.2| CC F.IF.4| CC F.IF.7| G.4.d| A.1.b| A.2.b
   **TOP:** 2-3 Problem 1 Finding Slope
   **KEY:** slope

8. **ANS:** A  **PTS:** 1  **DIF:** L3  **REF:** 2-3 Linear Functions and Slope-Intercept Form
   **OBJ:** 2-3.1 To graph linear equations
   **NAT:** CC A.CED.2| CC F.IF.4| CC F.IF.7| G.4.d| A.1.b| A.2.b
   **TOP:** 2-3 Problem 1 Finding Slope
   **KEY:** slope

9. **ANS:** C  **PTS:** 1  **DIF:** L2  **REF:** 2-3 Linear Functions and Slope-Intercept Form
   **OBJ:** 2-3.2 To write equations of lines
   **NAT:** CC A.CED.2| CC F.IF.4| CC F.IF.7| G.4.d| A.1.b| A.2.b
   **TOP:** 2-3 Problem 2 Writing Linear Equations
   **KEY:** linear equation | slope-intercept form | slope | y-intercept

10. **ANS:** C  **PTS:** 1  **DIF:** L3  **REF:** 2-3 Linear Functions and Slope-Intercept Form
    **OBJ:** 2-3.2 To write equations of lines
    **NAT:** CC A.CED.2| CC F.IF.4| CC F.IF.7| G.4.d| A.1.b| A.2.b
    **TOP:** 2-3 Problem 2 Writing Linear Equations
    **KEY:** linear equation | slope-intercept form | slope | y-intercept

11. **ANS:** C  **PTS:** 1  **DIF:** L3  **REF:** 2-3 Linear Functions and Slope-Intercept Form
    **OBJ:** 2-3.2 To write equations of lines
STA: AL A2.3b TOP: 2-4 Problem 6 Writing Equations of Parallel and Perpendicular Lines
KEY: perpendicular lines

22. ANS: A PTS: 1 DIF: L3 REF: 2-4 More About Linear Equations
OBJ: 2-4.1 To write an equation of a line given its slope and a point on the line
STA: AL A2.3b TOP: 2-4 Problem 6 Writing Equations of Parallel and Perpendicular Lines
KEY: parallel lines

23. ANS: C PTS: 1 DIF: L3 REF: 2-4 More About Linear Equations
OBJ: 2-4.1 To write an equation of a line given its slope and a point on the line
STA: AL A2.3b TOP: 2-4 Problem 6 Writing Equations of Parallel and Perpendicular Lines
KEY: parallel lines

24. ANS: B PTS: 1 DIF: L3 REF: 2-5 Using Linear Models
OBJ: 2-5.1 To write linear equations that model real-world data
STA: AL A2.11a TOP: 2-5 Problem 1 Using a Scatter Plot KEY: scatter plot | correlation

25. ANS: C PTS: 1 DIF: L3 REF: 2-5 Using Linear Models
OBJ: 2-5.1 To write linear equations that model real-world data
STA: AL A2.11a TOP: 2-5 Problem 3 Finding the Line of Best Fit
KEY: line of best fit | correlation coefficient

26. ANS: B PTS: 1 DIF: L2 REF: 2-6 Families of Functions
OBJ: 2-6.1 To analyze transformations of functions
KEY: translation | effect of a constant k on f(x): f(x) + k

27. ANS: C PTS: 1 DIF: L2 REF: 2-6 Families of Functions
OBJ: 2-6.1 To analyze transformations of functions
TOP: 2-6 Problem 2 Horizontal Translation
KEY: translation | transformation

28. ANS: D PTS: 1 DIF: L3 REF: 2-7 Absolute Value Functions and Graphs
OBJ: 2-7.1 To graph absolute value functions
TOP: 2-7 Problem 5 Writing and Absolute Value Function
KEY: absolute value function | piecewise function

29. ANS: B PTS: 1 DIF: L3 REF: 3-3 Systems of Inequalities
OBJ: 3-3.1 To solve systems of linear inequalities
STA: AL A2.8b
TOP: 3-3 Problem 1 Solving a System by Using a Table
KEY: systems of inequalities | table

30. ANS: A PTS: 1 DIF: L4 REF: 3-3 Systems of Inequalities
OBJ: 3-3.1 To solve systems of linear inequalities
STA: AL A2.8b
TOP: 3-3 Problem 1 Solving a System by Using a Table
KEY: systems of inequalities | table

31. ANS: B PTS: 1 DIF: L3 REF: 3-6 Solving Systems Using Matrices
OBJ: 3-6.2 To solve a system of linear equations using matrices
TOP: 3-6 Problem 4 Solving a System Using a Matrix
KEY: systems of equations | matrices

32. ANS: D PTS: 1 DIF: L3 REF: 3-6 Solving Systems Using Matrices
OBJ: 3-6.2 To solve a system of linear equations using matrices
33. ANS: A
PTS: 1
DIF: L3
REF: 3-6 Solving Systems Using Matrices
OBJ: 3-6.2 To solve a system of linear equations using matrices
NAT: CC A.REI.8| A.4.d
KEY: systems of equations | matrices

34. ANS: A
PTS: 1
DIF: L4
REF: 3-6 Solving Systems Using Matrices
OBJ: 3-6.2 To solve a system of linear equations using matrices
NAT: CC A.REI.8| A.4.d
KEY: systems of equations | matrices

35. ANS: A
PTS: 1
DIF: L4
REF: 3-6 Solving Systems Using Matrices
OBJ: 3-6.2 To solve a system of linear equations using matrices
NAT: CC A.REI.8| A.4.d
KEY: systems of equations | matrices

36. ANS: A
PTS: 1
DIF: L3
REF: 4-1 Quadratic Functions and Transformations
OBJ: 4-1.1 To identify and graph quadratic functions
NAT: CC A.CED.1| CC F.IF.4| CC F.IF.6| CC F.IF.7| CC F.BF.3| G.2.c| A.2.d
STA: AL A2.5b| AL A2.5d| AL A2.3a| AL A2.5a
TOP: 4-1 Problem 4 Using Vertex Form
KEY: parabola | vertex form | graphing | translation

37. ANS: C
PTS: 1
DIF: L3
REF: 4-3 Modeling With Quadratic Functions
OBJ: 4-3.1 To model data with quadratic functions
NAT: CC F.IF.4| CC F.IF.5| A.2.f
STA: AL A2.3b
TOP: 4-3 Problem 2 Using a Quadratic Model
KEY: quadratic model | quadratic function | word problem | problem solving | multi-part question

38. ANS: D
PTS: 1
DIF: L3
REF: 4-3 Modeling With Quadratic Functions
OBJ: 4-3.1 To model data with quadratic functions
NAT: CC F.IF.4| CC F.IF.5| A.2.f
STA: AL A2.3b
TOP: 4-3 Problem 3 Using Quadratic Regression

39. ANS: B
PTS: 1
DIF: L4
REF: 4-3 Modeling With Quadratic Functions
OBJ: 4-3.1 To model data with quadratic functions
NAT: CC F.IF.4| CC F.IF.5| A.2.f
STA: AL A2.3b
TOP: 4-3 Problem 3 Using Quadratic Regression

40. ANS: C
PTS: 1
DIF: L2
REF: 4-7 The Quadratic Formula
OBJ: 4-7.2 To determine the number of solutions by using the discriminant
NAT: CC A.REI.4.b| A.2.a| A.4.c| A.4.e| A.4.f
STA: AL A2.4a| AL A2.5c
TOP: 4-7 Problem 3 Using the Discriminant
KEY: discriminant | Quadratic Formula

41. ANS: B
PTS: 1
DIF: L2
REF: 4-7 The Quadratic Formula
OBJ: 4-7.2 To determine the number of solutions by using the discriminant
NAT: CC A.REI.4.b| A.2.a| A.4.c| A.4.e| A.4.f
STA: AL A2.4a| AL A2.5c
TOP: 4-7 Problem 3 Using the Discriminant
KEY: discriminant | Quadratic Formula

42. ANS: A
PTS: 1
DIF: L2
REF: 4-7 The Quadratic Formula
OBJ: 4-7.2 To determine the number of solutions by using the discriminant
NAT: CC A.REI.4.b| A.2.a| A.4.c| A.4.e| A.4.f
STA: AL A2.4a| AL A2.5c
TOP: 4-7 Problem 3 Using the Discriminant
KEY: discriminant | Quadratic Formula

43. ANS: A
PTS: 1
DIF: L2
REF: 4-7 The Quadratic Formula
OBJ: 4-7.2 To determine the number of solutions by using the discriminant
NAT: CC A.REI.4.b| A.2.a| A.4.c| A.4.e| A.4.f
STA: AL A2.4a| AL A2.5c
TOP: 4-7 Problem 3 Using the Discriminant
KEY: discriminant | Quadratic Formula
The Quadratic Formula

44. OBJ: 4-7.2 To determine the number of solutions by using the discriminant
NAT: CC A.REI.4.b| A.2.a| A.4.c| A.4.e| A.4.f
TOP: 4-7 Problem 3 Using the Discriminant
KEY: discriminant | Quadratic Formula

45. OBJ: 4-8.1 To identify, graph, and perform operations with complex numbers
NAT: CC N.CN.1| CC N.CN.2| CC N.CN.7| CC N.CN.8| N.5.f| A.4.g
TOP: 4-8 Problem 2 Graphing in the Complex Number Plane
KEY: complex number | complex number plane

46. OBJ: 4-9.1 To solve and graph systems of linear and quadratic equations
NAT: CC A.CED.3| CC A.REI.7| A.4.a| A.4.d
TOP: 4-9 Problem 4 Solving a Quadratic System of Inequalities

47. OBJ: 4-9.1 To solve and graph systems of linear and quadratic equations
NAT: CC A.CED.3| CC A.REI.7| A.4.a| A.4.d
TOP: 4-9 Problem 4 Solving a Quadratic System of Inequalities

48. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 2 Describing End Behavior of Polynomial Functions
KEY: polynomial | end behavior | turning point

49. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 2 Describing End Behavior of Polynomial Functions
KEY: polynomial | end behavior | turning point

50. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 2 Describing End Behavior of Polynomial Functions
KEY: polynomial | end behavior | turning point

51. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 3 Graphing Cubic Functions
KEY: polynomial function | end behavior | turning point

52. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 3 Graphing Cubic Functions
KEY: polynomial function | end behavior | turning point

53. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 3 Graphing Cubic Functions
KEY: polynomial function | end behavior | turning point

54. OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC A.SSE.1.a| CC F.IF.4| CC F.IF.7| CC F.IF.7.c
TOP: 5-1 Problem 4 Using Differences to Determine Degree
KEY: polynomial function | degree of a polynomial

ANS: A
PTS: 1
DIF: L3
REF: 5-1 Polynomial Functions

OBJ: 5-1.2 To graph polynomial functions and describe end behavior
NAT: CC.A.SSE.1.a| CC.F.IF.4| CC.F.IF.7| CC.F.IF.7.e

TOP: 5-1 Problem 4 Using Differences to Determine Degree
KEY: polynomial function | degree of a polynomial

ANS: D
PTS: 1
DIF: L3
REF: 5-2 Polynomials, Linear Factors, and Zeros

OBJ: 5-2.2 To write a polynomial function from its zeros
NAT: CC.A.SSE.1| CC.A.APR.3| CC.F.IF.7| CC.F.IF.7.c| CC.F.BF.1

TOP: 5-2 Problem 3 Writing a polynomial function from its zeros
KEY: factor theorem

ANS: B
PTS: 1
DIF: L3
REF: 5-2 Polynomials, Linear Factors, and Zeros

OBJ: 5-2.2 To write a polynomial function from its zeros
NAT: CC.A.SSE.1| CC.A.APR.3| CC.F.IF.7| CC.F.IF.7.c| CC.F.BF.1

TOP: 5-2 Problem 4 Finding the Multiplicity of a Zero
KEY: multiple zero | multiplicity

ANS: C
PTS: 1
DIF: L3
REF: 5-2 Polynomials, Linear Factors, and Zeros

OBJ: 5-2.2 To write a polynomial function from its zeros
NAT: CC.A.SSE.1| CC.A.APR.3| CC.F.IF.7| CC.F.IF.7.c| CC.F.BF.1

TOP: 5-2 Problem 4 Finding the Multiplicity of a Zero
KEY: multiple zero | multiplicity

ANS: A
PTS: 1
DIF: L4
REF: 5-4 Dividing Polynomials

OBJ: 5-4.1 To divide polynomials using long division

STA: AL A2.6b TOP: 5-4 Problem 2 Checking Factors

ANS: B
PTS: 1
DIF: L4
REF: 5-4 Dividing Polynomials

OBJ: 5-4.1 To divide polynomials using long division

STA: AL A2.6b TOP: 5-4 Problem 2 Checking Factors

ANS: D
PTS: 1
DIF: L3
REF: 5-8 Polynomial Models in the Real World

OBJ: 5-8.1 To fit data to linear, quadratic, cubic, or quartic models
NAT: CC.F.IF.4| CC.F.IF.5| CC.F.IF.6| CC.F.IF.7 TOP: 5-8 Problem 3 Comparing Models

ANS: A
PTS: 1
DIF: L3
REF: 6-3 Binomial Radical Expressions

OBJ: 6-3.1 To add and subtract radical expressions
NAT: CC.A.SSE.2| N.5.e| A.3.c| A.3.e

TOP: 6-3 Problem 3 Simplifying Before Adding or Subtracting
KEY: like radicals

ANS: A
PTS: 1
DIF: L4
REF: 6-3 Binomial Radical Expressions

OBJ: 6-3.1 To add and subtract radical expressions
NAT: CC.A.SSE.2| N.5.e| A.3.c| A.3.e

TOP: 6-3 Problem 3 Simplifying Before Adding or Subtracting
KEY: like radicals

ANS: B
PTS: 1
DIF: L2
REF: 6-4 Rational Exponents

OBJ: 6-4.1 To simplify expressions with rational exponents
NAT: CC.N.RN.1| CC.N.RN.2 TOP: 6-4 Problem 1 Simplifying Expressions with Rational Exponents
66. ANS: B  PTS: 1  DIF: L3  REF: 6-4 Rational Exponents
OBJ: 6-4.1 To simplify expressions with rational exponents  NAT: CC N.RN.1| CC N.RN.2
TOP: 6-4 Problem 4 Combining Radical Expressions  KEY: rational exponent

67. ANS: A  PTS: 1  DIF: L4  REF: 6-4 Rational Exponents
OBJ: 6-4.1 To simplify expressions with rational exponents  NAT: CC N.RN.1| CC N.RN.2
TOP: 6-4 Problem 5 Simplifying Numbers With Rational Exponents  KEY: rational exponent

68. ANS: A  PTS: 1  DIF: L3  REF: 6-4 Rational Exponents
OBJ: 6-4.1 To simplify expressions with rational exponents  NAT: CC N.RN.1| CC N.RN.2
TOP: 6-4 Problem 5 Simplifying Numbers With Rational Exponents  KEY: rational exponent

69. ANS: D  PTS: 1  DIF: L3  REF: 5-4 Dividing Polynomials
OBJ: 5-4.1 To divide polynomials using long division  NAT: CC A.APR.1| CC A.APR.2| CC A.APR.6| N.1.d| A.3.c| A.3.e
STA: AL A2.6b  TOP: 5-4 Problem 1 Using Polynomial Long Division

70. ANS: A  PTS: 1  DIF: L2  REF: 5-4 Dividing Polynomials
OBJ: 5-4.1 To divide polynomials using long division  NAT: CC A.APR.1| CC A.APR.2| CC A.APR.6| N.1.d| A.3.c| A.3.e
STA: AL A2.6b  TOP: 5-4 Problem 1 Using Polynomial Long Division

71. ANS: B  PTS: 1  DIF: L2  REF: 5-5 Theorems About Roots of Polynomial Equations
OBJ: 5-5.1 To solve equations using the Rational Root Theorem  NAT: CC N.CN.7| CC N.CN.8
TOP: 5-5 Problem 1 Finding a Rational Root  KEY: Rational Root Theorem

72. ANS: B  PTS: 1  DIF: L2  REF: 5-5 Theorems About Roots of Polynomial Equations
OBJ: 5-5.1 To solve equations using the Rational Root Theorem  NAT: CC N.CN.7| CC N.CN.8
TOP: 5-5 Problem 2 Using the Rational Root Theorem  KEY: Rational Root Theorem

73. ANS: C  PTS: 1  DIF: L3  REF: 5-6 The Fundamental Theorem of Algebra
OBJ: 5-6.1 To use the Fundamental Theorem of Algebra to solve polynomial equations with complex solutions  NAT: CC N.CN.7| CC N.CN.8| CC N.CN.9| CC A.APR.3
TOP: 5-6 Problem 1 Finding All the Roots of a Polynomial Function  KEY: Fundamental Theorem of Algebra | roots

74. ANS: D  PTS: 1  DIF: L2  REF: 5-7 The Binomial Theorem
OBJ: 5-7.1 To expand a binomial using Pascal's Triangle  NAT: CC A.APR.5| D.4.k
TOP: 5-7 Problem 1 Using Pascal's Triangle  KEY: Pascal's Triangle | expand

75. ANS: D  PTS: 1  DIF: L3  REF: 5-7 The Binomial Theorem
OBJ: 5-7.2 To use the Binomial Theorem  NAT: CC A.APR.5| D.4.k
TOP: 5-7 Problem 2 Expanding a Binomial  KEY: Binomial Theorem | expand

76. ANS: B  PTS: 1  DIF: L2  REF: 5-7 The Binomial Theorem
OBJ: 5-7.2 To use the Binomial Theorem  NAT: CC A.APR.5| D.4.k
TOP: 5-7 Problem 2 Expanding a Binomial  KEY: Binomial Theorem | expand

77. ANS: B  PTS: 1  DIF: L3  REF: 6-2 Multiplying and Dividing Radical Expressions
OBJ: 6-2.1 To multiply and divide radical expressions  NAT: CC A.SSE.2| N.5.e| A.3.c| A.3.e
TOP: 6-2 Problem 3 Simplifying a Product  KEY: simplest form of a radical

78. ANS: A  PTS: 1  DIF: L3
REF: 6-2 Multiplying and Dividing Radical Expressions

OBJ: 6-2.1 To multiply and divide radical expressions

TOP: 6-2 Problem 5 Rationalizing the Denominator

79. ANS: BPTS: 1 DIF: L2

OBJ: 6-3.1 To add and subtract radical expressions

TOP: 6-3 Problem 4 Multiplying Binomial Radical Expressions

80. ANS: CPTS: 1 DIF: L3

OBJ: 6-3.1 To add and subtract radical expressions

TOP: 6-3 Problem 6 Rationalizing the Denominator

NAT: CC A.SSE.2| N.5.e| A.3.c| A.3.e

KEY: rationalizing the denominator

NAT: CC A.SSE.2| N.5.e| A.3.c| A.3.e

KEY: like radicals

NAT: CC A.SSE.2| N.5.e| A.3.c| A.3.e

KEY: like radicals