WorkKeys®

Applied Mathematics

Prep Package

ACT®

Test Taking Tips

Although there are several different WorkKeys skill assessments, these practice materials focus on only a few of them. These practice tests contain multiple-choice items with a question followed by five possible answers from which you are to choose the ***best*** one. The following suggestions apply to all WorkKeys multiple-choice tests.

Pace yourself.

The time limits set for each WorkKeys test give nearly everyone enough time to finish all the questions. However, it is important to pace yourself. Don't spend too much time on one problem or reading section; go on to the other questions and come back if there is time.

Listen to and read the directions for each test carefully.

Before you begin taking one of the WorkKeys tests, pay careful attention to the directions. These tests ask for the ***best*** answer. It is important to keep this in mind when answering the questions, since it will sometimes be possible to think of responses that could be better than any of those offered or to defend a choice as not entirely wrong. Best-response formats are consistent with the real world, where choosing among less-than-perfect alternatives is routine.

You may want to work out the answer you feel is correct and look for it among the choices given. If your answer is not among the choices provided, reread the question and consider all of the answer choices again to find the best one.

Read each question carefully.

It is important that you understand what each question asks. Some questions will require you to go through several steps to find the best answer, while others can be answered more quickly.

Answer the easy questions first.

The best strategy for taking a test is to answer the easy questions and skip the questions you find difficult. After answering all of the easy questions, go back and try to answer the more difficult questions.

Use logic in more difficult questions.

When you return to the more difficult questions, try to use logic to eliminate incorrect answers to a question. Compare the answer choices to each other and note how they differ. Such differences may provide clues as to what the question requires. Eliminate as many incorrect answers as you can, then make an educated guess from the remaining answers.

Answer every question.

Your score on the WorkKeys tests will be based on the number of questions that you answer correctly; **there is no penalty for guessing.** Thus, you should answer every question within the time allowed for each test, even if you have to guess. You will be notified when there are five minutes remaining on each test.

Review your work.

If there is time left after you have answered every question on a test, go back and check your work on that test. Check to be sure that you marked only one answer to each question. You will not be allowed to go back to any other test or mark answers to a test after time has been called on that test.

Be precise in marking your answer document.

Be sure that you fill in the correct circles on your answer document. Check to be sure that the number for the line of circles on your answer document is the same as the number for the question you are answering. Position your answer document next to your test booklet so you can mark your answers quickly and completely.

Erase completely.

If you want to change an answer on your answer document, be sure to erase the unintended mark completely.

APPLIED MATHEMATICS

45 Minutes - 33 Questions

DIRECTIONS: There are 33 questions in this test, a small number of which are included for developmental purposes. Answers to these developmental questions will not count toward your score.

This test measures mathematics skills related to success in the workplace.

Each question in the test is numbered, and the five answer options are lettered. After calculating a solution, decide which answer is the best answer for each question. Next, find the row of ovals on the answer folder numbered the same as the question. Then, find the oval in that row lettered the same as your chosen answer. Finally, fill in the oval completely. Use a soft-lead pencil and make your marks heavy and dark.
DO NOT USE A PEN.

If you change your mind about an answer, erase your first oval thoroughly before filling in the new oval. For each question, make sure that you mark your answer in the row of ovals with the same number as the question.

On this test, you will not be penalized for guessing, so you should try to answer every question. Do not use too much time on any one question. If you do not know the correct answer, pick the one you think is best. Go back and check any questions you had difficulty with if you have time.

You should have a calculator and a WorkKeys formula sheet to use for this test. You may use them for any problems you choose. The formula sheet can be found at the beginning of this test booklet and may be torn out for easier use.

Note: Unless the problem indicates otherwise, you should assume all of the following.

1. Diagrams are not necessarily drawn to scale.
2. The word *line* indicates a straight line.
3. If a problem calls for pi (π), use the number 3.14 for that value. If you have a π key on your calculator and you use that key, your answers may not match any of the options given for the problem.
4. The word *average* indicates arithmetic mean. For example, the average of 2, 6, and 7 is calculated as follows: $(2 + 6 + 7) \div 3$.

To make sure that your calculator is working properly, please take the time to complete the following brief problems.

$9 \times 53 = ?$ (you should get 477)

$477 \div 15 = ?$ (you should get 31.8)

If you did not get the answers shown in parentheses, please tell the person who is administering the test.

The Answer Folder included is a sample; you can use it to simulate the testing environment and then score it yourself.

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO.

WorkKeys®

Applied Mathematics Formula Sheet

Distance
1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile ≈ 1.61 kilometers
1 inch = 2.54 centimeters
1 foot = 0.3048 meters
1 meter = 1,000 millimeters
1 meter = 100 centimeters
1 kilometer = 1,000 meters
1 kilometer ≈ 0.62 miles

Area
1 square foot = 144 square inches
1 square yard = 9 square feet
1 acre = 43,560 square feet

Volume
1 cup = 8 fluid ounces
1 quart = 4 cups
1 gallon = 4 quarts
1 gallon = 231 cubic inches
1 liter ≈ 0.264 gallons
1 cubic foot = 1,728 cubic inches
1 cubic yard = 27 cubic feet
1 board foot = 1 inch by 12 inches by 12 inches

Weight/Mass
1 ounce ≈ 28.350 grams
1 pound = 16 ounces
1 pound ≈ 453.592 grams
1 milligram = 0.001 grams
1 kilogram = 1,000 grams
1 kilogram ≈ 2.2 pounds
1 ton = 2,000 pounds

Rectangle
perimeter = $2(\textit{length} + \textit{width})$
area = $\textit{length} \times \textit{width}$

Rectangular Solid (Box)
volume = $\textit{length} \times \textit{width} \times \textit{height}$

Cube
volume = $(\textit{length of side})^3$

Triangle
sum of angles = 180°
area = $\frac{1}{2}(\textit{base} \times \textit{height})$

Circle
number of degrees in a circle = 360°
circumference ≈ $3.14 \times \textit{diameter}$
area ≈ $3.14 \times (\textit{radius})^2$

Cylinder
volume ≈ $3.14 \times (\textit{radius})^2 \times \textit{height}$

Cone
volume ≈ $\dfrac{3.14 \times (\textit{radius})^2 \times \textit{height}}{3}$

Sphere (Ball)
volume ≈ $\frac{4}{3} \times 3.14 \times (\textit{radius})^3$

Electricity
1 kilowatt-hour = 1,000 watt-hours
amps = watts ÷ volts

Temperature
°C = $0.56\,(°F - 32)$ or $\frac{5}{9}(°F - 32)$
°F = $1.8\,(°C) + 32$ or $(\frac{9}{5} \times °C) + 32$

NOTE: Problems on the WorkKeys *Applied Mathematics* assessment should be worked using the formulas and conversions on this formula sheet.

ACT®

DO YOUR FIGURING HERE.

1. A grocer takes delivery of beverages from your truck at $6 per case. You unloaded 53 cases for the grocer today. How much does the grocer owe you?

   A. $ 9
   B. $ 47
   C. $ 59
   D. $318
   E. $653

2. To make curtains for a living room window for a customer, you will need three pieces of fabric in the following lengths: 3 feet, 3 feet, and 5 feet. What is the total length of fabric you will need?

   F. 8 feet
   G. 11 feet
   H. 14 feet
   J. 30 feet
   K. 45 feet

3. In your job as a cashier, a customer gives you a $20 bill to pay for a can of coffee that costs $3.84. How much change should you give back?

   A. $15.26
   B. $16.16
   C. $16.26
   D. $16.84
   E. $17.16

4. You sell pies at a farmers' market for $7.50 each. A group of 5 kids wants to pitch in equally to share one of your pies. How much will each of them need to pay to buy a whole pie together?

   F. $0.75
   G. $1.50
   H. $2.50
   J. $3.75
   K. $7.50

5. Your warehouse had 51 cases of Happy Cola at the start of your shift. A truck arrived this morning with another 25 cases of Happy Cola. How many cases of Happy Cola do you have now?

   A. 2
   B. 25
   C. 26
   D. 51
   E. 76

6. You work at a fruit market. Bananas cost 50¢ a pound. A customer hands you a bunch of bananas that weighs 3 pounds. How much should you charge for the bunch of bananas?

   F. $0.17
   G. $0.50
   H. $0.53
   J. $1.50
   K. $3.50

7. As a bowling instructor, you calculate your students' averages during tournaments. In 5 games, one bowler had the following scores: 143, 156, 172, 133, and 167. What was that bowler's average?

   A. 147
   B. 153
   C. 154
   D. 156
   E. 161

DO YOUR FIGURING HERE.

8. You need about $1\frac{1}{2}$ hours to set up a computer workstation.

   At this rate, how many hours should it take you to set up 7 of these workstations?

   F. $4\frac{2}{3}$

   G. $8\frac{1}{2}$

   H. 10

   J. $10\frac{1}{2}$

   K. $11\frac{2}{3}$

9. You are balancing the checking account for your new lawn-care business. Based on the check register below, how much money is in the account?

Check number	Date	Memo	Check amount	Deposit amount	Balance
	7/1	Deposit		$581.22	$.
101	7/3	Rake & axe	$27.91		$.
102	7/5	Van repair	$52.81		$.
103	7/5	New mower	$265.80		$.
104	7/6	Gas	$10.00		$.
	7/31	Deposit		$330.67	$.

A. $330.67
B. $356.52
C. $555.37
D. $581.22
E. $911.89

10. The diaper service where you work bills customers once a week. Each week, it charges 30¢ each for the first 75 diapers used, and 25¢ each for any additional diapers. How much should you bill a family that used 100 diapers last week?

F. $18.75
G. $22.50
H. $25.00
J. $28.75
K. $30.00

11. For your job, you often fly between Seattle and Miami. The distance between these cities is 2,724 miles. You earn a free flight after you accumulate 25,000 miles of travel. How many round trips (back and forth) must you make between Seattle and Miami in order to earn a free flight?

A. 4
B. 5
C. 8
D. 9
E. 10

12. You are a receptionist at a doctor's office. A patient's bill for a checkup totals $85.00. The patient's health insurance requires the patient to pay 20% of the total bill. How much should the patient pay for the checkup?

F. $ 4.25
G. $ 8.50
H. $17.00
J. $42.50
K. $68.00

DO YOUR FIGURING HERE.

13. You are scheduling a new delivery route and you need to find out how long it will take a driver to complete the route. You start the route at 9:50 A.M. and finish at 2:05 P.M. How long does it take to drive the route?

    A. 4 hours 15 minutes
    B. 4 hours 55 minutes
    C. 5 hours 15 minutes
    D. 5 hours 45 minutes
    E. 7 hours 45 minutes

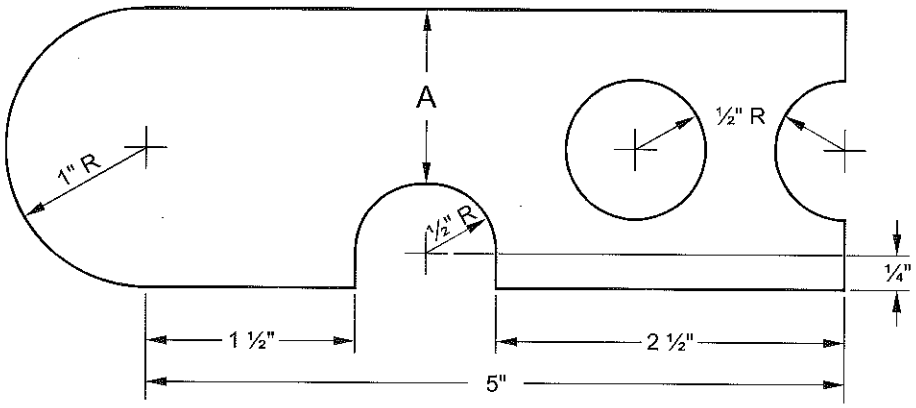
14. You are making a welding fixture and must cut down a length of steel tubing from $19\frac{3}{8}$ inches to $11\frac{9}{16}$ inches. When you cut the tubing, you will waste $\frac{1}{16}$ inch of it because of the width of the saw cut. If the leftover piece is long enough, you will use it in another fixture. How long will this leftover piece be?

    F. $7\frac{3}{4}$
    G. $7\frac{13}{16}$
    H. $7\frac{7}{8}$
    J. $8\frac{1}{4}$
    K. $8\frac{3}{4}$

15. A refrigeration system at your company uses temperature sensors fixed to read Celsius (°C) values, but the system operators in your control room understand only the Fahrenheit scale. You have been asked to make a Fahrenheit (°F) label for the high temperature alarm, which is set to ring whenever the system temperature rises above –10°C. What Fahrenheit value should you write on the label?

    A. –50°F
    B. –23°F
    C. –18°F
    D. 14°F
    E. 26°F

16. You check on manufactured parts in a factory. You need to take measurements to ensure quality. According to the drawing shown, what is the measurement of dimension A?



F. ¾"
G. 1"
H. 1¼"
J. 1½"
K. 1¾"

17. The price of a shampoo, cut, and style at the hairstyling salon where you work is $18.00. You generally get a 20% tip from each customer, and the salon owner pays you $\frac{1}{4}$ of each job's cost. On a typical day, you give shampoos, cuts, and styles to 8 customers. About how much can you expect to earn for yourself on such a day?

A. $ 48.96
B. $ 57.60
C. $ 64.80
D. $147.60
E. $208.80

18. As a laboratory assistant, you measure chemicals using the metric system. For your current research, you need to measure out 45 grams of sodium chloride. The bottle you are using lists the amount in ounces. About how many ounces of sodium chloride will you need?

F. 0.1
G. 1.6
H. 28.4
J. 720.0
K. 1,275.8

19. You are doing marketing research to find out the purchasing potential of students in the community. Based on the latest census, there are 9,860 students in a population of 62,400 people. What percent of the total population is students?

A. 6.3
B. 7.3
C. 15.8
D. 52.5
E. 84.2

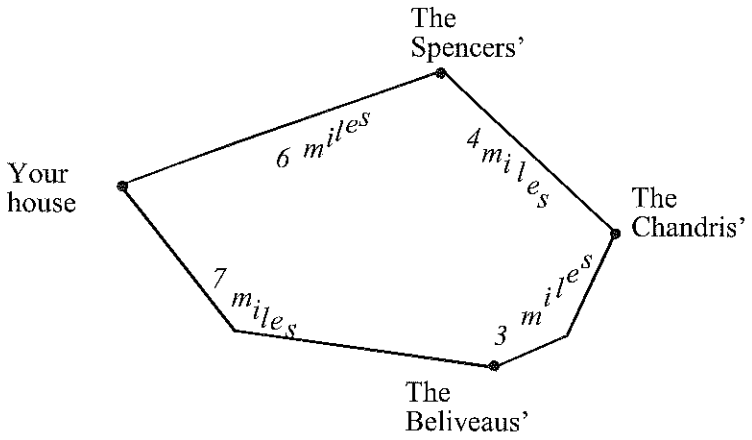
20. Your client has saved $1,860 for a down payment on a house. A government loan program requires a down payment equal to 3% of the loan amount. What is the largest loan amount that your client could receive with this program?

F. $ 5,580
G. $ 6,200
H. $55,800
J. $61,380
K. $62,000

21. At Appliance City you sold a refrigerator to a customer for $369.00. Appliance City advertises that if a customer finds the same refrigerator anywhere else for a lower price you will give them a refund equal to 150% of the price difference. A customer arrives with a Kitchen Stuff Inc. ad that shows the same refrigerator for $335.00. After giving the advertised refund to the customer, what is the customer's final cost?

A. $ 51.00
B. $219.00
C. $318.00
D. $335.00
E. $364.00

22. The map below shows the location of 3 houses where you had to do lawn work today. Your truck gets 8 miles per gallon of gasoline, so you chose the shortest route from your house to the jobs and then back home, as shown below. If gas costs $1.52 per gallon, what was the total cost of the gas that you used today?



F. $2.50
G. $3.42
H. $3.80
J. $6.20
K. $7.50

23. You need to haul a load of patio bricks to a job site. Each brick weighs 4 pounds 14 ounces. Your truck can carry a ¾-ton load. How many bricks can your truck carry in a full load?

A. 300
B. 307
C. 362
D. 409
E. 483

24. You are applying fertilizer to a football field. The field is 360 feet long and 160 feet wide. You use 8 pounds of fertilizer per 1,000 square feet. The fertilizer comes in 50-pound bags. How many bags of fertilizer will you need to complete the job?

F. 6
G. 7
H. 8
J. 9
K. 10

25. You are a school photographer taking individual and class pictures for 2 classes of 21 students each. On average, each individual picture takes 3 minutes and a class picture takes 10 minutes. About how long should it take you to get all of the pictures?

A. 1 hour 3 minutes
B. 1 hour 13 minutes
C. 2 hours 6 minutes
D. 2 hours 16 minutes
E. 2 hours 26 minutes

26. You need to put oil into the gearbox of a rebuilt machine tool. The gearbox holds 16.3 liters of oil but the only oil you have is in 1-quart containers. How many of the 1-quart containers of oil will you need to fill the gearbox with 16.3 liters of oil?

F. 1
G. 5
H. 17
J. 18
K. 62

27. At the metal-casting company where you work, you must set up a conveyor system to move castings from the furnace to the heat treatment area 55 yards away. The castings cool at the rate of 0.3°F (degrees Fahrenheit) per second and must not be allowed to cool more than 7°F before being heat treated. What is the minimum speed, in feet per second, that the conveyor must move?

A. 2.10
B. 2.36
C. 2.62
D. 4.86
E. 7.07

28. Five days a week, you carpool with 3 co-workers and take turns driving each week. It is 14 miles from your home to your office. When you drive the carpool you must go an extra 4 miles to pick up your co-workers. If your car averages 18 miles per gallon, about how many gallons of gas should you save every 4 weeks by carpooling?

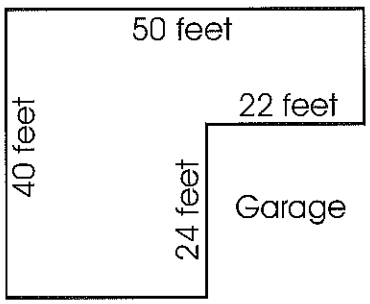
F. 4.2
G. 8.9
H. 10
J. 21.1
K. 31.1

29. You just finished paving a rectangular driveway measuring 75 feet by 20 feet. You charged the customer $1,000. After deducting the expenses shown below, how much profit did your company make on this job?

Item/ Expense	Unit Cost	Quantity	Total Expense
gravel	$15 per cubic yard	12 ½ cubic yards	$
tar/sealant	15¢ per square foot	75 ft by 20 ft	$
labor	$10 per hour	25 hours	$
insurance	Not applicable	Not applicable	$45.00

A. $292.50
B. $300.00
C. $337.50
D. $517.35
E. $707.50

30. You need to pump water out of a flooded basement, using two 50-gallon-per-minute (gpm) pumps. The basement has the dimensions shown and is flooded to a depth of 16 inches. How long will it take to pump the water out of the basement?



F. 18 minutes
G. 1 hour 47 minutes
H. 2 hours 27 minutes
J. 3 hours 19 minutes
K. 4 hours 54 minutes

31. To complete bookshelves, a customer at your store needs to purchase vertical brackets to attach to the wall. The customer wants the shelving to be 9 feet high and 10 feet long. The wall brackets come in 48-inch and 60-inch sections. The 48-inch sections cost $12.95; the 60-inch sections cost $16.95. The brackets should be 1 foot from each end and no more than 24 inches apart. What will be the total cost of the brackets, before tax?

A. $ 89.70
B. $119.60
C. $129.50
D. $149.50
E. $179.40

32. You have to order fencing for a 25-acre, rectangular field. One side of the field measures exactly $\frac{1}{4}$ mile. How many yards of fencing will you need to enclose the field completely?

F. 1,320
G. 1,430
H. 4,290
J. 363,000
K. 1,089,000

33. You are an urban planner assessing the growth of a city. Ten years ago, the city's population was 249,583. Its current population is 318,270. By about what percentage has the city grown over the past ten years?

A. 13%
B. 22%
C. 28%
D. 69%
E. 78%

STOP! END OF TEST.