

WorkKeys[®]

**Preparing
for the
WorkKeys[®]
Assessments**

ACT[®]

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Some Basic Information

What is WorkKeys?

The WorkKeys system from ACT is designed to help you develop better workplace skills. Better skills mean better-paying jobs—in any career field.

The WorkKeys system consists of job profiling (finding out which skills are needed on the job), assessments (the tests you'll be taking plus several others), reporting (telling you how your skills match job requirements), and instructional support (guidance to educators related to improving students' skill levels).

Why is WorkKeys important?

In many places throughout the United States, employers find that students are not adequately trained even for entry level jobs. WorkKeys helps businesses and educators work together to ensure that you leave school prepared for real jobs in the real world.

What types of skills are needed?

WorkKeys measures skills that employers believe are critical to job success—skills such as reading, math, listening, locating information, and teamwork. These skills are valuable for any type of occupation—skilled or professional—and at any level of education.

How does the system work?

WorkKeys helps you figure out how prepared you are for jobs that interest you and guides you to the education and training you need. The system documents your work skills in key areas, giving you an edge with employers when you apply for jobs.

Isn't it easy to find a job in today's economy?

There are plenty of jobs available, but employers are having a great deal of trouble finding workers with adequate skills. With the right training and experience, people can move from low-skill, low-pay jobs to high-skill, high-pay jobs.

So are these tests designed for only low-level, blue-collar jobs?

Not at all. WorkKeys has determined the job skills needed for more than 7,000 unique job titles, ranging from accountant to automotive technician and from welder to webmaster. In fact, the fastest growing types of WorkKeys job profiles are being done for professional, technical, and managerial jobs that require at least a bachelor's degree. The abilities to learn, listen, communicate, work in teams, and solve problems—all areas addressed by WorkKeys—are important assets for any employee, regardless of career choice.

Do higher skills mean higher salaries?

Studies show that jobs requiring higher skills in math, locating information, and reading pay higher entry level salaries. By increasing your skills while you are still in school, you increase your opportunities for higher salaries in the future.

Why should I care about these tests?

Since WorkKeys tests are fairly new and aren't the college entrance exam that many high school students focus on, some students don't see the purpose in trying to do their best on them. You need to remember, however, that everyone enters the workforce eventually—whether you get a job right out of high school, work part time while continuing your education, or go through extensive postsecondary training. WorkKeys stresses skills development important for every type of employment.

Why do some of the test questions seem irrelevant to my career choice?

Since WorkKeys questions relate to a variety of real-life experiences, the situations sometimes deal with work environments that do not interest particular students. Even very difficult exams, such as the Law School Admission Test or the Graduate Record Examination, routinely contain analytical reasoning questions that feature taxi drivers, executives, carpet sellers, professors, bellhops, architects, and numerous other workers. The basic skills needed to solve a legal question, configure a computer, or schedule employee vacations may be similar for all these tests. And while some WorkKeys test questions can be fairly easy, others are quite difficult—to measure the widest possible range of skills.

Can I study for the tests?

Since WorkKeys measures applied skills, you can't cram to memorize answers for the tests. However, you can use these practice sets to see typical WorkKeys test questions.

What happens to the test results?

You can use your WorkKeys results to get a better picture of jobs you are ready for and to improve areas where your skills are weak. Employers can use the results to determine how qualified you are for positions in their organizations. And schools can use the information—along with input from employers—to ensure that their curriculum provides adequate work skills training to meet the needs of businesses.

Test Taking Tips

Although there are several different WorkKeys skill assessments, you will be taking only the *Applied Mathematics* and *Reading for Information* tests as part of the examination. A description of each follows. Both 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 both 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 would 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. The test administrator will announce 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.

WorkKeys Applied Mathematics Assessment

Applied Mathematics is skill in applying mathematical reasoning and problem-solving techniques to work-related problems. Solving mathematical problems in the workplace can differ from solving problems in the classroom. While the math skills needed are the same, math problems in the workplace are not usually laid out neatly in a textbook format. Instead, the employee may be responsible for identifying and locating the necessary information (e.g., on a cash register, price tag, or catalog) and for knowing what to do with that information. It is, therefore, critical to strengthen your core mathematics skills and to develop your problem-solving strategies. Individuals possessing these Applied Mathematics skills will be able to successfully tackle new situations involving mathematics problems in the workplace. A formula sheet that includes all formulas required for the assessment is provided.

There are five levels in the Applied Mathematics skill scale, ranging from Level 3, the least complex, to Level 7, the most complex. These levels were developed based on two main criteria:

- the types of mathematical operations employees must perform, and
- the form and order in which employees receive the information; that is, the presentation of the information.

The skills at the lowest level involve using whole numbers and some decimals in basic math operations: addition, subtraction, multiplication, and division. As the levels progress, the math operations involve more steps. Furthermore, they include decimals and fractions, conversion of units, averaging, calculating area and volume, and ratios.

As the complexity of the levels increases, the presentation of the information becomes more of a barrier to problem solving. The wording becomes ambiguous, the presence of unnecessary information is more likely, and pertinent information is less obvious. Regardless of skill level, most of these problems will involve one or more of the following applications:

Quantity

Employees often need to determine the number of items sold, produced, or purchased, or to figure totals on a per unit basis.

Money

Working with monetary units is a central part of business and relates to virtually every job, if in no other way than to understanding a paycheck. Tasks involving monetary units include figuring sales, costs, wages, and expenses.

Time

Some tasks involve figuring elapsed time. Other problems are also frequently figured in terms of time (e.g., production, sales, costs, distance, area). In many of these tasks, employees must be familiar with conversion of time units.

Measurement

Calculating distance, area, weight, and volume is crucial to most work situations. Again, employees must be familiar with conversions, as well as the appropriate degree of accuracy needed for different situations.

Proportions and Percentages

Proportions can be used in many tasks that require making predictions (e.g., if this is the amount for X units, how much is needed for Y units). Percentages are used in the workplace to calculate commissions, discounts, taxes, price increases, changes in sales, and wage changes.

Averages

Many records in the workplace are expressed in terms of averages (e.g., those involving sales records, wages, costs, hours worked). These averages become tools in the decision-making processes of the business.

Many math problems found in the workplace combine two or more applications: What **quantity** can be produced in a specified **time**? What **distance** can be traveled in a particular **time**? What is the **average** cost in terms of **money**? A common combination of applications is finding the best deal, which requires employees to perform various calculations and then compare the results in terms of relative cost. Examples of typical problems are found in the WorkKeys Applied Mathematics Practice Set.

Calculators

WorkKeys recommends the use of calculators for the *Applied Mathematics* test. No problem on the test requires the use of a calculator; however, it is generally to your advantage to use one.

- If you regularly use one in class or when doing your homework, it makes sense to use one on the test. But if you aren't comfortable using a calculator, you may decide not to use one on the test. You can always bring one and decide not to use it. Pack it the night before so you won't forget it in the morning.
- We recommend that you use a calculator that you are used to—as long as it is not one of the kinds that are not permitted. Using a more powerful calculator that you are not familiar with is unlikely to give you an advantage over the kind you normally use.
- You may use any four-function, scientific, or graphing calculator, unless it has features described in the **Prohibited Calculators** list. For models on the **Calculators Permitted with Modification** list, you will be required to modify some of the calculator's features.

Prohibited Calculators

- These types of calculators are prohibited:
 - ✓ pocket organizers
 - ✓ handheld or laptop computers
 - ✓ electronic writing pads or pen-input devices—The Sharp EL 9600 is permitted.
 - ✓ calculators built into cellular phones or other electronic communication devices
 - ✓ calculators with a typewriter keypad (keys in QWERTY format)—Calculators with letter keys not in QWERTY format are permitted.
 - ✓ calculators with built-in computer algebra systems—Prohibited calculators in this category include:
 - ❑ Casio: Algebra fx 2.0, ClassPad 300, and all model numbers that begin with CFX-9970G
 - ❑ Texas Instruments: All model numbers that begin with TI-89 and TI-92
 - ❑ Hewlett-Packard: hp 48GII and all model numbers that begin with hp 40G or hp 49G

Calculators Permitted with Modification

- These types of calculators are permitted, but only after they are modified as noted:
 - ✓ calculators with paper tapes: *Remove the tape.*
 - ✓ calculators that make noise: *Turn off the sound.*
 - ✓ calculators that can communicate wirelessly with other calculators: *Completely cover the infrared data port with heavy opaque material, such as duct tape or electrician's tape (includes Hewlett-Packard HP-38G series and HP-48G).*
 - ✓ calculators that have power cords: *Remove all power/electrical cords.*
- If you plan to use a calculator, you must bring one with you to the test. You can't share calculators and the test supervisor will **not** lend you one.
- Make sure your calculator works properly. Bring a spare calculator or extra batteries, if you wish. Test supervisors will **not** have extra batteries or calculators.
- You may use a calculator **only** for the *Applied Mathematics* test.
- If you bring a calculator, the test supervisor will make sure that you:
 - ✓ use an acceptable type of calculator
 - ✓ use your backup calculator only if your primary calculator fails
 - ✓ do **not** share your calculator with any other test taker
 - ✓ do **not** store test materials in your calculator's memory
- If your calculator has large characters (one-inch high or larger) or a raised display, the supervisor may assign you to a seat where no other test taker can see your calculator.

WorkKeys Applied Mathematics Practice Set

This practice set can help you understand the WorkKeys Applied Mathematics skill levels and give you practice for the actual WorkKeys assessment. However, remember that this practice set is **not** a full-length test and your score is **not** a substitute for the actual WorkKeys test score. The actual test consists of 33 problems and has a time limit of 45 minutes.

The WorkKeys *Applied Mathematics* assessment measures skill in applying mathematical reasoning to work-related problems. The test involves setting up and solving the types of problems and doing the types of calculations that actually occur in the workplace. It is designed to be taken with a calculator and a formula sheet, as both would be available on the job. There are five skill levels, ranging from Level 3 to Level 7. As you move from Level 3 to Level 7, the mathematical concepts and calculations become more complex.

Applied Mathematics Formula Sheet

Distance

- 1 foot = 12 inches
- 1 yard = 3 feet
- 1 mile = 5,280 feet
- 1 mile \approx 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 \approx 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 \approx 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 \approx 28.350 grams
- 1 pound = 16 ounces
- 1 pound \approx 453.592 grams
- 1 milligram = 0.001 grams
- 1 kilogram = 1,000 grams
- 1 kilogram \approx 2.2 pounds
- 1 ton = 2,000 pounds

Rectangle

- perimeter = $2(\text{length} + \text{width})$
- area = $\text{length} \times \text{width}$

Rectangular Solid (Box)

- volume = $\text{length} \times \text{width} \times \text{height}$

Cube

- volume = $(\text{length of side})^3$

Triangle

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

Circle

- number of degrees in a circle = 360°
- circumference $\approx 3.14 \times \text{diameter}$
- area $\approx 3.14 \times (\text{radius})^2$

Cylinder

- volume $\approx 3.14 \times (\text{radius})^2 \times \text{height}$

Cone

- volume $\approx \frac{3.14 \times (\text{radius})^2 \times \text{height}}{3}$

Sphere (Ball)

- volume $\approx \frac{4}{3} \times 3.14 \times (\text{radius})^3$

Electricity

- 1 kilowatt-hour = 1,000 watt-hours
- amps = watts \div volts

Temperature

- $^\circ\text{C} = 0.56 (^\circ\text{F} - 32)$ or $\frac{5}{9} (^\circ\text{F} - 32)$
- $^\circ\text{F} = 1.8 (^\circ\text{C}) + 32$ or $(\frac{9}{5} \times ^\circ\text{C}) + 32$

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

Applied Mathematics Level 3

Individuals with Level 3 skills can set up and solve problems with a single type of mathematical operation (addition, subtraction, multiplication, or division) on whole numbers, fractions, decimals, or percentages.

1. 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?
 - A. \$0.17
 - B. \$0.50
 - C. \$0.53
 - D. \$1.50
 - E. \$3.50

2. To make curtains for a living room window for a customer, you will need 3 pieces of fabric in the following lengths: 3 feet, 3 feet, and 5 feet. What is the total length of fabric you will need?
 - A. 8 feet
 - B. 11 feet
 - C. 14 feet
 - D. 30 feet
 - E. 45 feet

3. 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?
 - A. \$0.75
 - B. \$1.50
 - C. \$2.50
 - D. \$3.75
 - E. \$7.50

Applied Mathematics Level 4

Individuals with Level 4 skills can set up and solve problems with one or two different mathematical operations (addition, subtraction, multiplication, or division) on whole numbers, fractions, decimals, or percentages.

1. 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?
 - A. \$ 4.25
 - B. \$ 8.50
 - C. \$17.00
 - D. \$42.50
 - E. \$68.00

2. 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

3. As a bowling instructor, you calculate your bowlers' 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

Applied Mathematics Level 5

Individuals with Level 5 skills can set up and solve problems with several steps of logic and calculation involving a mixture of whole numbers, fractions, decimals, or percentages.

1. 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?
 - A. 0.1
 - B. 1.6
 - C. 28.4
 - D. 720.0
 - E. 1,275.8

2. 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?
 - A. $7\frac{3}{4}$
 - B. $7\frac{13}{16}$
 - C. $7\frac{7}{8}$
 - D. $8\frac{1}{4}$
 - E. $8\frac{3}{4}$

3. 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 do students make up?
 - A. 6.3
 - B. 7.3
 - C. 15.8
 - D. 52.5
 - E. 84.2

Applied Mathematics Level 6

Individuals with Level 6 skills can set up and solve problems containing unnecessary information and requiring multiple steps. Calculations involve a mixture of whole numbers, fractions, decimals, or percentages.

1. 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

2. 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?
 - A. 6
 - B. 7
 - C. 8
 - D. 9
 - E. 10

3. 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 a refund equal to 150% of the price difference. The customer returns with a Kitchen Stuff Inc. ad that shows the same refrigerator for \$335.00. After you give 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

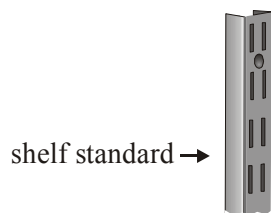
Applied Mathematics Level 7

Individuals with Level 7 skills can set up and solve complex problems requiring extensive calculations. They can calculate rate of change, set up and manipulate complex ratios and proportions, find multiple areas or volumes of two- and three-dimensional shapes, find the best economic value of several alternatives, and locate errors in multiple-step calculations.

1. 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%

2. You are comparing prices from 2 office supply stores. Your office needs 5 cases of blue paper. Home & Office Headquarters lists a case of paper at \$25.85 with a 10% discount on an order of 5 cases or more. Office Supplies R Us lists a case of paper at \$27.36 with a 15% discount on 5 cases or more. Delivery costs from Home & Office Headquarters are \$2.50 per case. Office Supplies R Us will deliver for \$10 an order. What is the least amount that you would have to spend for the paper?
 - A. \$ 23.26
 - B. \$ 33.26
 - C. \$ 71.80
 - D. \$126.28
 - E. \$141.75

3. To complete adjustable bookshelves, a customer at your store needs to purchase shelf standards to attach to the wall. The customer wants the shelving to be 9 feet high and 10 feet wide. The shelf standards come in 48-inch and 60-inch sections. The 48-inch sections cost \$12.95; the 60-inch sections cost \$16.95. The standards should be placed 1 foot from each end of a shelf and no more than 24 inches apart. Before tax is added, what will be the total cost of the shelf standards the customer will need?



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

An Important Consideration about the Answers to the Practice Sets

Some WorkKeys questions have a response choice (the “key”) that can be clearly defined as right or correct and other response choices (the “distractors” or “foils”) that can be identified as wrong or incorrect. Many WorkKeys questions, however, are in a best-response format: the keyed response is simply the best of those available. It is important to keep this in mind when discussing such questions, since it will sometimes be possible to think of responses that would be better than any of those offered, or to defend a distractor as not entirely wrong. Best-response formats are consistent with the real world, where choices among less-than-perfect alternatives are routinely the case.

Note: The solutions shown indicate one or two ways to solve each problem. There may be other, equally valid methods of solving the problems.

Answers to Applied Mathematics Level 3 Practice Set

Answer to Level 3 Sample Item 1:

Multiply the cost per pound by the number of pounds to find the total cost.

- A. Incorrect: $50 \div 3 = 16.67\text{¢} = \0.1667 , rounded up to \$0.17 (divided instead of multiplying)
- B. Incorrect: $50 \times 1 = 0.50$ (cost of 1 pound of bananas, not 3)
- C. Incorrect: $50 + 3 = 0.53$ (added instead of multiplying)
- D. **Correct:** 50¢ (cost per pound) \times 3 (pounds of bananas) = $150\text{¢} = \$1.50$ (total cost of bananas)
- E. Incorrect: 3 pounds, 50 \rightarrow 3.50 (just put the numbers from the problem together without doing the math)

Answer to Level 3 Sample Item 2:

Add the three lengths together to find the total length.

- A. Incorrect: $3 + 5 = 8$ (added only two of the three lengths)
- B. **Correct:** 3 feet + 3 feet + 5 feet = 11 feet
- C. Incorrect: $(3 \times 3) + 5 = 14$ (multiplied the first two lengths instead of adding, then added the third length) or $(3 + 3 + 5) + 3 = 14$ (added the number of pieces of fabric to the lengths of those pieces)
- D. Incorrect: $(3 + 3) \times 5 = 30$ (added the first two lengths but then multiplied by the third length instead of adding)
- E. Incorrect: $(3 \times 3) \times 5 = 45$ (multiplied all of the numbers instead of adding)

Answer to Level 3 Sample Item 3:

Divide the cost of an item by the number of persons paying for it to determine how much each person should pay.

- A. Incorrect: $7.50 \div 10$ or 7.50 with the decimal place changed = 0.75 (divided by 10 instead of 5 or simply changed the decimal place of the cost of the whole pie)
- B. **Correct:** $\$7.50$ per pie \div 5 kids pitching in for the pie = $\$1.50$ to be paid by each member of the group
- C. Incorrect: $7.50 - 5$ or $7.50 \div 3 = 2.50$ (subtracted 5 from the cost of a whole pie instead of dividing by 5 or divided by 3 instead of 5)
- D. Incorrect: $7.50 \div 2 = 3.75$ or $7.50 \times 5 = 37.50 \rightarrow 3.75$ (divided by 2 instead of 5 or multiplied by 5 instead of dividing and shifted the decimal)
- E. Incorrect: $7.50 \div 1 = 7.50$ (total amount needed to buy a whole pie)

Answers to Applied Mathematics Level 4 Practice Set

Answer to Level 4 Sample Item 1:

Multiply the patient's bill of \$85.00 by 20% (0.20) to find the amount the patient needs to pay.

- A. Incorrect: $85 \div 20 = 4.25$ (divided the charges by 20 instead of multiplying by 0.20)
- B. Incorrect: $85 \div 10$ or $85 \times 0.10 = 8.50$ (divided the charges by 10 or multiplied by 0.10 instead of multiplying by 0.20)
- C. **Correct:** $\$85$ (total bill) $\times 0.20$ (% copay) = \$17.00
- D. Incorrect: $85 \div 2 = 42.50$ (divided the charges by 2 instead of multiplying by 0.20)
- E. Incorrect: $85 \times 0.80 = 68.00$ (calculated the insurance company's portion instead of the patient's)

Answer to Level 4 Sample Item 2:

Change the times to correspond to the 24-hour clock by adding 12 to the P.M. time, then subtract the starting time from the ending time.

- A. **Correct:** (2:05 P.M. – 9:50 A.M.) = (14 hours 5 minutes – 9 hours 50 minutes) = (13 hours 65 minutes – 9 hours 50 minutes) = 4 hours 15 minutes
- B. Incorrect: (2:05 P.M. – 9:50 A.M.) = (14 hours 5 minutes – 9 hours 50 minutes) = (13 hours 105 minutes – 9 hours 50 minutes) = 4 hours 55 minutes (borrowed one hour but added 100 minutes)
- C. Incorrect: (2:05 P.M. – 9:50 A.M.) = (14 hours 5 minutes – 9 hours 50 minutes) = (14 hours 65 minutes – 9 hours 50 minutes) = 5 hours 15 minutes (added 60 minutes but forgot to subtract one hour)
- D. Incorrect: (2:05 P.M. – 9:50 A.M.) = (14 hours 5 minutes – 9 hours 50 minutes) = 5 hours 45 minutes (subtracted the minutes the wrong way)
- E. Incorrect: (9:50 – 2:05) = (9 hours 50 minutes – 2 hours 5 minutes) = 7 hours 45 minutes (ignored the A.M. and P.M. and subtracted the times given the wrong way)

Answer to Level 4 Sample Item 3:

Add the five scores together and divide by 5 to find the bowler's average.

- A. Incorrect: $(133 \times 172) \div 156 = 146.6$, rounded up to 147 (multiplied the low score by the high score, then divided by the median score)
- B. Incorrect: $(133 + 172) \div 2 = 152.5$, rounded up to 153 (added the low and high scores, then divided by 2)
- C. **Correct:** $(143 + 156 + 172 + 133 + 167) \div 5 = 154.2$, rounded down to 154
- D. Incorrect: 156 is the median of the 5 scores (2 numbers below, 2 numbers above)
- E. Incorrect: $(143 + 172 + 167) \div 3 = 160.7$, rounded up to 161 (added the first, third, and fifth scores, then divided by 3)

Answers to Applied Mathematics Level 5 Practice Set

Answer to Level 5 Sample Item 1:

Using the value given on the formula sheet, divide the number of grams by the number of grams per ounce to find the number of ounces needed.

- A. Incorrect: $45 \div 453.592 = 0.099208$, rounded up to 0.1 (divided by the number of grams/pound instead of the number of grams/ounce)
- B. **Correct:** $45 \text{ grams} \div 28.350 \text{ grams/ounce} = 1.58730$, rounded up to 1.6 ounces
- C. Incorrect: Approximate number of grams/ounce (28.350 on the formula sheet, rounded up to 28.4; no calculation was done on the amount given in the problem)
- D. Incorrect: $45 \times 16 = 720.0$ (multiplied by the number of ounces/pound instead of dividing by the number of grams/ounce)
- E. Incorrect: $45 \times 28.350 = 1,275.75$, rounded up to 1,275.8 (multiplied by the number of grams/ounce instead of dividing)

Answer to Level 5 Sample Item 2:

Subtract the new length as well as the width of the saw cut from the total length to get the length of the leftover piece.

- A. **Correct:** $19 \frac{3}{8} - 11 \frac{9}{16} - \frac{1}{16} = 19 \frac{6}{16} - 11 \frac{9}{16} - \frac{1}{16} = 18 \frac{22}{16} - 11 \frac{9}{16} - \frac{1}{16} = 7 \frac{12}{16} = 7 \frac{3}{4}$
- B. Incorrect: $19 \frac{3}{8} - 11 \frac{9}{16} = 19 \frac{6}{16} - 11 \frac{9}{16} = 18 \frac{22}{16} - 11 \frac{9}{16} = 7 \frac{13}{16}$ (didn't account for the saw cut width)
- C. Incorrect: $19 \frac{3}{8} - (11 \frac{9}{16} - \frac{1}{16}) = 19 \frac{6}{16} - (11 \frac{9}{16} - \frac{1}{16}) = 18 \frac{22}{16} - 11 \frac{8}{16} = 7 \frac{14}{16} = 7 \frac{7}{8}$
(subtracted the saw cut from the piece cut instead of the total length)
- D. Incorrect: $19 \frac{3}{8} - 11 \frac{9}{16} - \frac{1}{16} = (19 - 11) + (\frac{9}{16} + \frac{1}{16} - \frac{3}{8}) = (19 - 11) + (\frac{10}{16} - \frac{6}{16}) = 8 \frac{4}{16} = 8 \frac{1}{4}$ (wrong order of fractions)
- E. Incorrect: $19 \frac{3}{8} - 11 \frac{9}{16} = (19 - 11) + \frac{9-3}{16-8} = 8 \frac{6}{8} = 8 \frac{3}{4}$ (subtracted in both the numerator and the denominator)

Answer to Level 5 Sample Item 3:

Divide the number of students by the total population, then multiply by 100 to find the percentage of students in the total population.

- A. Incorrect: $62,400 \div 9,860 = 6.3$ (divided the wrong way and did not change to a percent)
- B. Incorrect: $(62,400 + 9,860) \div 9,860 = 7.3$ (added students to the total population, then divided by the number of students)
- C. **Correct:** $9,860 \div 62,400 \times 100 = 15.8\%$ (the number of students divided by the total number of people multiplied by 100 to get a percentage)
- D. Incorrect: $(62,400 - 9,860) \div 1,000 = 52.5$ (subtracted the number of students from the total population, then divided by 1,000 to make the answer seem reasonable)
- E. Incorrect: $(62,400 - 9,860) \div 62,400 \times 100 = 84.2$ (found the percent of nonstudents)

Answers to Applied Mathematics Level 6 Practice Set

Answer to Level 6 Sample Item 1:

Multiply the number of students per class by the number of minutes per student for each individual picture by the number of classes, then add the number of classes times the number of minutes per class picture.

- A. Incorrect: $21 \times 3 = 63 = 1 \text{ hour } 3 \text{ minutes}$ (calculated only the time needed to take individual pictures for one of the classes)
- B. Incorrect: $(21 \times 3) + 10 = 73 = 1 \text{ hour } 13 \text{ minutes}$ (calculated only the time needed to take individual pictures and one class picture)
- C. Incorrect: $(21 \times 3) \times 2 = 126 = 2 \text{ hours } 6 \text{ minutes}$ (calculated only the time needed to take individual pictures for the two classes)
- D. Incorrect: $(21 \times 3) \times 2 + 10 = 136 = 2 \text{ hours } 16 \text{ minutes}$ (calculated the time needed to take individual pictures for the two classes and only one class picture)
- E. **Correct:** $(21 \text{ students/class} \times 3 \text{ minutes/student picture}) \times 2 \text{ classes} + (2 \text{ classes} \times 10 \text{ minutes/class picture}) = 146 \text{ minutes} = 2 \text{ hours } 26 \text{ minutes}$

Answer to Level 6 Sample Item 2:

Multiply the length of the field by the width to find the area. Multiply the area by the number of pounds of fertilizer divided by 1,000 square feet. Divide the number of pounds by the number of pounds per bag to get the number of bags of fertilizer needed.

- A. Incorrect: $360 \div 160 \div 8 \times 1,000 \div 50 = 5.6$, rounded up to 6 (divided the dimensions of the field instead of multiplying, divided instead of multiplying by 8, multiplied instead of dividing by 1,000, then divided by 50)
- B. Incorrect: $360 \times 160 \div 8 \div 1,000 = 7.2$, rounded down to 7 (divided the area of the field by pounds of fertilizer per 1,000 square feet instead of multiplying, then divided by 1,000 square feet; didn't factor in the 50-pound bags)
- C. Incorrect: $360 \times 160 \div 1,000 - 50 = 7.6$, rounded up to 8 (divided the area of the field by 1,000 square feet, then subtracted 50 instead of dividing by 50, and didn't factor in 8 pounds/1,000 square feet, or just chose 8 because it appears in the problem)
- D. Incorrect: $(360 \times 160) \times 8 \div 1,000 \div 50 = 9.2$, rounded down to 9 (calculated correctly, but rounded down instead of up, which would not give enough to cover the whole field)
- E. **Correct:** $360 \text{ feet} \times 160 \text{ feet} = 57,600 \text{ square feet}$; $57,600 \text{ square feet} \times 8 \text{ pounds of fertilizer} \div 1,000 \text{ square feet} = 460.8 \text{ pounds of fertilizer}$; $460.8 \text{ pounds} \div 50 \text{ pounds/bag} = 9.216$, rounded up to 10 bags needed

Answer to Level 6 Sample Item 3:

Subtract the lesser price from what the customer paid in order to find the difference. Multiply the difference by 150% (1.50), then subtract this refund amount from what the customer originally paid to find the final cost of the refrigerator.

- A. Incorrect: $(369 - 335) \times 1.50 = 51$ (just found the refund amount)
- B. Incorrect: $369 - 150 = 219$ (the percent was used as a dollar amount and subtracted from the amount paid)
- C. **Correct:** $\$369.00 - [(\$369.00 - \$335.00) \times 1.50] = \318.00
- D. Incorrect: $369 - (369 - 335) = 335$ (used the lower price, or subtracted the difference in prices from the price paid)
- E. Incorrect: $369 - [(369 - 335) \times 0.15] = 363.90$, rounded up to 364 (changed the percent to a decimal by dividing by 1,000 instead of 100)

Answers to Applied Mathematics Level 7 Practice Set

Answer to Level 7 Sample Item 1:

Subtract the previous population from the current population to find the increase in population. Divide the increase by the previous population, then multiply this number by 100 to get a percentage.

- A. Incorrect: $318,270 \div 249,583 = 1.275$; $1.275 \times 10 = 12.75$, rounded up to 13 (divided the current population by the previous population instead of subtracting, then moved the decimal on the result by multiplying by 10 instead of 100)
- B. Incorrect: $318,270 - 249,583 = 68,687$; $68,687 \div 318,270 = 0.216$; $0.216 \times 100 = 21.6$, rounded up to 22 (divided the difference between the previous and current populations by the current population instead of the previous population)
- C. **Correct:** $318,270 - 249,583 = 68,687$; $68,687 \div 249,583 = 0.275$; $0.275 \times 100 = 27.5\%$, rounded up to 28%
- D. Incorrect: $318,270 - 249,583 = 68,687$; $68,687 \div 1,000 = 68.7$, rounded up to 69 (subtracted the previous population from the current population, then divided the result by 1,000 instead of the previous population to get a percentage)
- E. Incorrect: $249,583 \div 318,270 = 0.784$; $0.784 \times 100 = 78.4$, rounded down to 78 (divided the previous population by the current population instead of subtracting the previous population from the current population, then multiplied by 100 to get a percentage)

Answer to Level 7 Sample Item 2:

Multiply the price of one case by the discount rate (divided by 100 to convert to a decimal). Subtract the discount amount from the price of one case and multiply by the number of cases. Add the cost of delivery to get the final cost. Do this for both companies and choose the smaller (underlined) total.

- A. Incorrect: $\$25.85 - (\$25.85 \times 0.10) = \$23.27$ or $\$27.36 - (\$27.36 \times 0.15) = \underline{\$23.26}$ (the price for one case with the discount instead of the price for five cases; forgot the delivery charge)
- B. Incorrect: $\$25.85 - (\$25.85 \times 0.10) + (5 \times \$2.50) = \$35.77$ or $\$27.36 - (\$27.36 \times 0.15) + \$10 = \underline{\$33.26}$ (calculated the price for one case with the discount instead of five cases)
- C. Incorrect: $5 \times (\$25.85 - 10) + (5 \times \$2.50) = \$91.75$ or $5 \times (\$27.36 - 15) + \$10 = \underline{\$71.80}$ (used the percentage discount as a dollar amount)
- D. **Correct:** $5 \times [\$25.85 - (\$25.85 \times 0.10)] + (5 \times \$2.50) = \$128.83$ for the first store; $5 \times [\$27.36 - (\$27.36 \times 0.15)] + \$10 = \underline{\$126.28}$ for the second store
- E. Incorrect: $5 \times (\$25.85 + \$2.50) = \underline{\$141.75}$ or $(5 \times \$27.36) + \$10 = 146.80$ (did not calculate the discounts)

Answer to Level 7 Sample Item 3:

Determine which shelf standards are needed to give a height of 9 feet (one of each size makes one set). Determine how many sets of standards are needed to support the 10-foot shelves (standards are needed at the 1, 3, 5, 7, and 9-foot locations along the 10-foot shelves, so 5 sets are needed.) Add the shelf standard prices together to get the price of one set and multiply by the number of sets needed.

- A. Incorrect: 48 inches = 4 feet; 60 inches = 5 feet; 4 feet + 5 feet = 9-foot height needed; $(12.95 + 16.95) \times 3 = 89.70$ (calculated the cost of 3 sets of standards when 5 are needed)
- B. Incorrect: 48 inches = 4 feet; 60 inches = 5 feet; 4 feet + 5 feet = 9-foot height needed; $(12.95 + 16.95) \times 4 = 119.60$ (calculated the cost of 4 sets of standards when 5 are needed)
- C. Incorrect: 48 inches = 4 feet; 4 feet \times 2.5 standards = 10 feet; $12.95 \times 2.5 \times 4 = 129.50$ (calculated the cost for $2\frac{1}{2}$ 48-inch sections [giving a height of 10 feet instead of 9 feet] \times 4 sets of standards instead of 5 sets of one standard of each length)
- D. **Correct:** 48 inches = 4 feet; 60 inches = 5 feet; 4 feet + 5 feet = 9-foot height needed for each set; $(\$12.95 + \$16.95)/\text{set} \times 5 \text{ sets} = \149.50
- E. Incorrect: 48 inches = 4 feet; 60 inches = 5 feet; 4 feet + 5 feet = 9-foot height needed; $(12.95 + 16.95) \times 6 = 179.40$ (calculated the cost of 6 sets of standards when only 5 are needed)

WorkKeys Reading for Information Assessment

Reading for Information is skill in reading and understanding work-related instructions and policies. Such material, known as *procedural* text, differs from the explanatory and narrative text on which most reading programs are based. In addition, unlike reading and content-area texts, which are usually organized to make the reading easy to understand, workplace communication is not necessarily designed to be easy to read. It may even be poorly or unclearly written. These differences can be drawbacks for many employees when reading and understanding much of the material they encounter on the job.

There are five levels in the Reading for Information skill scale, and the skills included can be loosely grouped into four categories:

Choosing Main Ideas or Details

This requires skill at selecting the important information and supporting details from a written document. Looking for main ideas and details is a common reading task. But, as mentioned previously, reading texts encountered in the workplace differ from the selections most often used in reading programs. In such programs, the main idea is generally found in the topic sentence at the beginning of a paragraph or occasionally in a concluding sentence. However, written communication found in the workplace is often not constructed in such an organized manner. Consequently, the employee needs to be able to use clues other than placement to identify the main ideas and important details.

Understanding Word Meanings

Although some basic vocabulary is involved in this skill area, the emphasis is on using context to determine specific word meanings. The demands of the workplace progress from the need to know simple words and identify definitions clearly stated in the reading to the need to use the context to determine the meanings of more difficult words. Jargon, technical terminology, and words with multiple meanings are used increasingly as the contexts become more complex.

Applying Instructions

Conveying instructions is the principal purpose of a great deal of workplace communication. Skill in applying instructions involves sequencing and generalizing. As in the other skill areas, the workplace requirements range from the simple to the more complex. As the levels increase, the instructions contain more steps and conditionals are added. At the lower levels, employees need only apply instructions to clearly described situations; at the higher levels, employees must apply instructions to less similar and, eventually, to new situations.

Applying Information and Reasoning

Often, for effective performance of a task, it is necessary for employees to apply information given in workplace communications to similar or new situations, to predict consequences of certain actions, and to understand the reasoning, which may or may not be stated, behind a policy. As in the previous category, employees may be asked to apply information and reasoning to clearly described situations at the lower levels, while, at higher levels, they must apply information and reasoning to similar and then to new situations.

This practice set gives examples of the reading materials and questions on the *WorkKeys Reading for Information* test.

WorkKeys Reading for Information Practice Set

This practice set can help you understand the WorkKeys skill levels and give you practice for the actual WorkKeys assessment. However, remember that this practice set is **not** a full-length test and your score is **not** a substitute for the actual WorkKeys test score. The actual test consists of 33 questions and has a time limit of 45 minutes. Several questions may be grouped together and relate to a single piece of reading material.

WorkKeys Reading for Information is the skill people use when they read and use written text in order to do a job. The written texts include memos, letters, directions, signs, notices, bulletins, policies, and regulations. It is often the case that workplace communications are not necessarily well-written or targeted to the appropriate audience. Reading for Information materials do not include information that is presented graphically, such as in charts, forms, or blueprints. There are five skill levels, from Level 3 to Level 7. As you move from Level 3 to Level 7, both the materials and the tasks become more complex.

Reading for Information Level 3

Individuals with Level 3 skills understand basic words and can identify main ideas. They understand when to follow each step in a set of instructions and can apply the instructions to situations that are the same as the one they are reading about. Level 3 materials include simple instructions, company policies, and announcements. They are short and straightforward, and contain basic vocabulary.

MARCO Industries



14428 Del Rio
San Diego, CA

To: All Employees
Fr: President's Office
Re: Holiday Closing

The past year has been a good one for MARCO Industries. Our sales are way up. I believe that there will be more orders for our products in the new year, too.

All of you have worked very hard and should be rewarded. So I have decided to close MARCO Industries from December 24 through January 2. All employees will get a paid vacation during that time. This vacation will not count against your regular paid vacation time. It is a bonus. Simply write "holiday leave" on your time sheets for those dates.

1. Based on this memo, what should you write on your time sheet for December 24 though January 2?
 - A. Bonus sales
 - B. Holiday leave
 - C. Industry closed
 - D. Paid vacation
 - E. Regular vacation

CLEANROOM PRACTICES

YOU MAY NOT USE ANY COSMETICS IN THE CLEANROOM. YOU MUST CLEAN OFF FACE POWDER, EYE SHADOW, MASCARA, AND LIPSTICK. NON-OIL-BASED LOTIONS ARE ACCEPTABLE BUT SHOULD BE APPLIED BEFORE ENTERING THE MAIN AREA.

TO PREVENT CONTAMINATION OF PRODUCT, NO COLOGNE, PERFUME, HAIR SPRAY, HAIR GEL, OR FINGERNAIL POLISH MAY BE WORN. FINGERNAILS MUST NOT GO MORE THAN 0.25 INCH PAST THE FINGERTIPS AND CANNOT PUNCH THROUGH GLOVES.

THE ONLY METAL ORNAMENT ALLOWED INSIDE THE CLEANROOM IS A WEDDING BAND (WRIST WATCHES ARE NOT ALLOWED). IF THE WEDDING BAND IS NOT SMOOTH, NYLON GLOVES MUST BE WORN UNDER VINYL GLOVES.

2. What type of product can you have in the cleanroom?
- A. Face powder
 - B. Fingernail polish
 - C. Hair spray
 - D. Mild cologne
 - E. Non-oil-based lotions

Hardemuth

Department Store
Housewares Department

All items in stock must have a sample displayed. The samples must have a scannable bar code on the bottom. Put a hanging price tag on all samples with the regular price displayed. Sale prices should be displayed on a yellow hangtag in a plastic jacket. Finally, post a sign with the regular price on the shelf underneath each sample item.

Cookware sets must have both an eight-piece sample set and a thirteen-piece sample set for display only. Separate the boxes with the cookware sets. Boxes with eight-piece sets must be kept on the shelf above the eight-piece sample set. Boxes with thirteen-piece sets must be kept on the shelf above the thirteen-piece sample set.

3. In the department store where you work, you are asked to mark prices for an upcoming sale. If the thirteen-piece cookware set is going on sale, where should you mark the sale price?
- A. Beside the display on a separate sign
 - B. On a yellow hangtag in a plastic jacket
 - C. On the display items with a yellow marker
 - D. On the regular hanging price tag
 - E. Over the bar code on the bottom of the box

Reading for Information Level 4

Individuals with Level 4 skills can apply instructions to situations that are the same as the situations in the reading materials. They can identify cause-effect relationships and define words by the context. Level 4 materials may include several details or describe processes involving several steps.

New Policy

Effective immediately, the following Company Standard for Dress will be in force at all times:

Except on specially designated holidays, business dress attire will always be worn by all upper-level management due to the heavy contact these individuals have with clients and the public. This attire is limited to business suits/slacks for both women and men.

However, casual dress is allowed for all middle-level employees during the core work week (Monday through Thursday). This casual dress will consist of long- or short-sleeved shirts; polo shirts; khaki pants; "dress walking shorts," hemmed at the knee level or lower; and "dress" canvas shoes. Jeans, printed T-shirts, or regular tennis shoes are not allowed on core casual dress days.

Fridays have been officially declared "Jeans Day" here at our company. On Fridays, any kind of jeans are permitted (colored denims, blue jeans, etc.) However, these jeans must be in new or next-to-new condition, with no holes, writing, or other obvious "statement makers." Printed T-shirts and regular tennis shoes are still prohibited on Friday.

1. According to the policy shown, "dress walking shorts" are:
 - A. banned if they are hemmed above the knee.
 - B. banned on Friday unless they are made of colored denim.
 - C. permitted on any Monday through Thursday if worn with a new printed T-shirt.
 - D. permitted only on Friday and must be hemmed below the knee.
 - E. permitted only on Friday if the hemline is at the knee.

