ACT WorkKeys

Applied Math 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

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 = $2(length + width)$
area = $length \times width$

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

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

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

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

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

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

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

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

Temperature
$°C = \frac{5}{9}(°F - 32)$

$°F = \frac{9}{5}(°C) + 32$

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 are a circus equipment manager. You need to know the combined weight of the performers on the high-wire act. The performers weigh 175 pounds, 154 pounds, and 118 pounds. What is the total weight of the performers, in pounds?

   A. 211
   B. 293
   C. 329
   D. 447
   E. 500

2. The fraternity house you manage has 6,270 square feet of lot space. City ordinance allows one student for every 330 square feet of lot space. How many students can live in this house?

   A. 19
   B. 33
   C. 297
   D. 594
   E. 5,940

3. 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

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. At the greenhouse where you work you need to make soil and vermiculite mixtures for potting plants. Flowering bushes need a mixture of 70% soil and 30% vermiculite by volume. About how many buckets of vermiculite should you add to 5 buckets of soil?

   A. 1.5
   B. 2.0
   C. 3.5
   D. 6.0
   E. 11.5

2. The Zippy Lube business where you work printed coupons offering $8.00 off any oil change this month. An oil change costs $19.95 and a new oil filter costs $4.95. A customer comes in with a coupon and has you change the oil and filter. Before adding the tax, how much should you charge the customer?

   A. $11.95
   B. $16.90
   C. $24.90
   D. $27.95
   E. $32.90

3. You are repairing an engine and need to loosen a bolt that fastens the alternator bracket to the engine. You tried a $\frac{3}{4}$-inch wrench, which was too large, and a $\frac{5}{8}$-inch wrench, which was too small. Which of the following wrenches is between these two sizes?

   A. $\frac{5}{16}$-inch
   B. $\frac{3}{8}$-inch
   C. $\frac{9}{16}$-inch
   D. $\frac{11}{16}$-inch
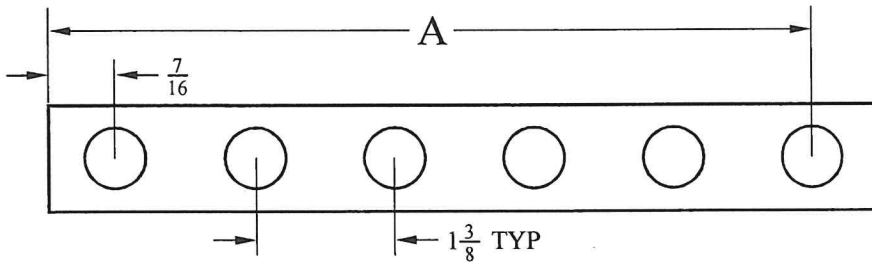   E. $\frac{7}{8}$-inch

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. 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

2. Pictured below is a piece of steel with six holes drilled in it. As inspector for your machine shop, it is your duty to check the part. TYP is short for "typical", and it means all holes are $1\frac{3}{8}$ inches from the center of one hole to the center of the next. What is dimension A?

    A. $5\frac{15}{16}$
    B. $6\frac{7}{8}$
    C. $7\frac{1}{16}$
    D. $7\frac{5}{16}$
    E. $8\frac{11}{16}$

3. At your hardware store, you buy hammers for $30.00 a dozen and sell them for $3.50 each. What is the percent markup for the hammers?

    A.   29%
    B.   40%
    C.   42%
    D.   58%
    E.   71%

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 plan to attend night school in 3 months so you can qualify for a promotion at work. You need to earn an additional $1,140 for tuition within that time. You take a second job, which pays $8 per hour. The work schedule is flexible, and you can work as many hours as you want. Taxes take 15% of your wages and you save the rest. Over the next 3 months, what is the minimum number of hours you could work each month to earn the money for tuition?

    A.   14
    B.   48
    C.   56
    D.   84
    E.   168

2. You work for a landscaper that has a customer needing to seed an area of land 80 feet by 40 feet in size. The garden center has 5-pound bags of grass seed. Each bag of seed can cover 25 square yards of land. Based on your calculations, how many bags of grass seed do you need to cover the lot?

    A.   14
    B.   15
    C.   25
    D.   43
    E.   128

3. You work at a bridal shop. You need to find out how much satin you will need to make four bridesmaids' dresses and two flower girls' dresses. Each bridesmaid's dress requires $4\frac{3}{8}$ yards of satin, and each flower girl's dress requires $3\frac{2}{3}$ yards of satin. How many yards of satin do you need in all?

    A. $14\frac{1}{24}$
    B. $17\frac{1}{2}$
    C. $23\frac{1}{24}$
    D. $24\frac{2}{5}$
    E. $24\frac{5}{6}$

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 design and build furniture, and you have agreed to build a bookcase for a customer. Using a materials list, you determine that you need 4 boards 1 inch by 8 inches by 6 feet and 3 boards 1 inch by 6 inches by 4 feet. These boards are priced at $1.25 per board foot. In addition, you will need 3 packages of screws at $0.79 each and one can of varnish at $3.75. Sales tax is 6%. What will be the total cost of all the materials for the bookcase, including tax?

   A. $33.62
   B. $33.96
   C. $35.64
   D. $41.91
   E. $54.19

2. You have a 30-amp power strip with four outlets. The power source is 110 volts. Based on the information shown, which of the following combinations of devices could you use on this power strip?

Drill Press	1320 watts
Bench Grinder	1100 watts
Orbital Sander	880 watts
½" Drill	605 watts
Worklight	150 watts

   A.   Drill press, bench grinder, orbital sander, ½ " drill
   B.   Drill press, bench grinder, orbital sander, worklight
   C.   Drill press, orbital sander, two ½ " drills
   D.   Drill press, orbital sander, ½ " drill, worklight
   E.   Bench grinder, orbital sander, two ½ " drills, worklight

3. It is your job to clean and maintain the fish tank in a dentist's office. The tank is 4 feet long and 2 feet wide. The water in it is about 2 feet deep. To treat the water in the tank, you need to add 1 teaspoon of disinfecting solution for every 10 gallons of water. About how many teaspoons of the solution will you need to add to the tank?

   A. $\frac{1}{2}$
   B. $1\frac{1}{2}$
   C.   12
   D.   31
   E.   120