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.

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?

shelf standard →

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