

Fractions and decimals in order

Place fractions and decimals in order.

For example, you can order the set of numbers:

$$\frac{1}{4}, 0.5, \frac{3}{8}, 0.9$$

In order from smallest to largest:

$$\frac{1}{4}, \frac{3}{8}, 0.5, 0.9$$

Question:

Between which pair of decimals should $\frac{4}{7}$ be placed on a number line?

- (A) 0.3 and 0.4
- (B) 0.4 and 0.5
- (C) 0.5 and 0.6
- (D) 0.6 and 0.7

NEXT

Multiples and factors

Find multiples and factors.

For example:

- the least common multiple of 3 and 5 is 15
- the greatest common factor of 12 and 30 is 6

Question:

Susan and Daphne are participating in a walk-a-thon at the local community college track to raise money. Susan can walk around the track in 4 minutes. Daphne can walk around the track in 6 minutes. Susan and Daphne started walking at the same time. How many minutes will it be until they complete a lap at the same time?

- (A) 2
- (B) 10
- (C) 12
- (D) 24

PREVIOUS

NEXT

Simplify exponents

Simplify numerical expressions with exponents

For example, $2^6 \times 2^5 = 2^{11}$

Question:

Simplify.

$$(2^9 \times 3^5) \times (2^4 \times 3)^2$$

(A) 6^{20}

(B) 6^{24}

(C) $2^{13} \times 3^7$

(D) $2^{17} \times 3^7$

PREVIOUS

NEXT

Distance between numbers on a number line

Find the distance between numbers on a number line using absolute value.

For example, on a number line with points plotted at -2 and 4, the distance between the points is 6.

Question:

The points -4 and 5 are plotted on a number line. What is the distance, in units, between the two points?

- A 1
- B 4
- C 8
- D 9

PREVIOUS

NEXT

Whole numbers, fractions, and decimal problems.

Compute and solve problems with whole numbers, fractions, and decimals.

Question:

Simplify.

$$12 + 15 \div 3 \times 6 - 4$$

A 18

B 22

C 38

D 50

PREVIOUS

NEXT

Squares, square roots, cubes, and cube roots

Calculate and compute with squares, square roots, cubes, and cube roots of numbers.

Question:

Add.

$$3\sqrt{7} + \sqrt{7}$$

(A) $4\sqrt{7}$

(B) $3\sqrt{14}$

(C) $4\sqrt{14}$

(D) $3\sqrt{49}$

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NEXT

Undefined expressions

Know that expressions with a denominator of zero are "undefined" and have no solution.

Identify "undefined" numerical expressions which have no solution, including:

- a denominator of zero
- square roots of negative numbers

Question:

Which expression is undefined in the set of real numbers?

(A) $\sqrt{-4}$

(B) $\frac{0}{-4}$

(C) 0^4

(D) -4×0

PREVIOUS

NEXT

Unit rates

Find unit rates.

For example:

- miles per hour
- dollars per pound

A store charges \$6.96 for a case of mineral water.

- Each case contains 2 boxes of mineral water.
- Each box contains 4 bottles of mineral water.

Question:

What is the cost of each bottle of mineral water?

- (A) \$0.87
- (B) \$1.16
- (C) \$1.74
- (D) \$3.48

PREVIOUS

NEXT

Objects at scale

Use scale factors to convert dimensions between scale drawings and actual objects.

For example, you might be presented with an image of the dimensions of a room. The image may use 1 inch to represent 1 foot of real space in the room.

Question:

A scale drawing of a house uses a scale of 0.5 inches = 2 feet. What is the length, in inches, of a line on the scale drawing that represents an actual length of 5 feet?

- (A) 1.25
- (B) 2.5
- (C) 10
- (D) 20

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NEXT

Multiple-step problems that use ratios, proportions, and percents

Solve multiple-step problems that use ratios, proportions, and percentages.

Examples of multi-step problems include:

- Simple interest
- Percent increase and decrease
- Gratuities
- Commissions

Question:

The price of Veronica's meal before tax and tip was \$11.92. Veronica paid 8% tax, then added a 15% tip to the total. To the nearest cent, how much did Veronica pay for her meal?

- A \$12.87
- B \$13.71
- C \$14.66
- D \$14.80

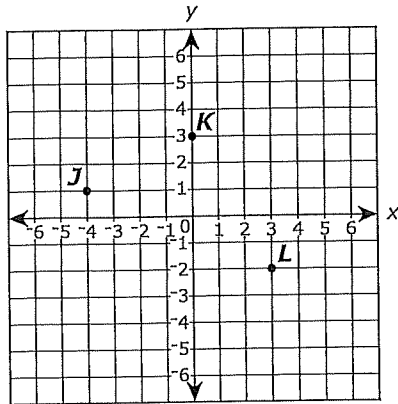
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FINISH

Locate points and graph equations

Locate points and graph linear equations in a coordinate plane.

Points J , K , and L are plotted on a coordinate grid.



Question:

What are the coordinates of the points on the coordinate grid?

- A $J(1, -4); K(3, 0); L(-2, 3)$
- B $J(-4, 1); K(0, 3); L(3, -2)$
- C $J(-4, 1); K(0, 3); L(-2, 3)$
- D $J(-4, 1); K(3, 0); L(3, -2)$

NEXT

Slope of a line from a graph, equation, or table

Find the slope of a line from a graph, equation, or table.

Question:

What is the slope of the line represented by the equation $3x + 4y = 8$?

A $-\frac{4}{3}$

B $-\frac{3}{4}$

C $\frac{3}{4}$

D $\frac{4}{3}$

PREVIOUS

NEXT

Proportional relationships for equations and graphs

Determine whether an equation and a graph show the same proportional relationship.

Question:

Chelsea designs beaded bracelets. The equation $P = 7 + 0.05b$ can be used to find the price, P , of a bracelet that has b beads. What does the number 0.05 in the equation represent?

- (A) the price of each bead
- (B) the price of each bracelet
- (C) the number of bracelets made
- (D) the number of beads in a bracelet

PREVIOUS

NEXT

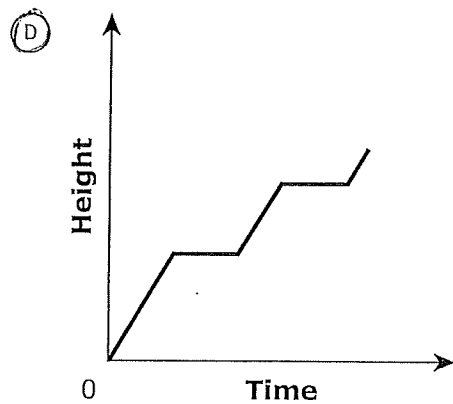
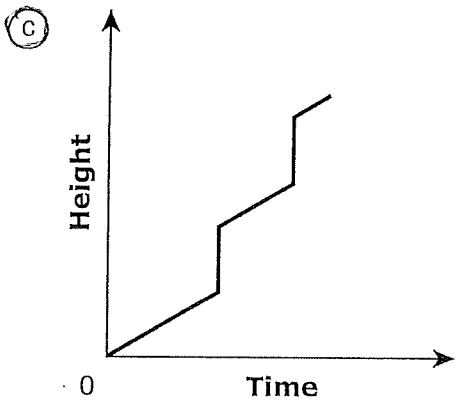
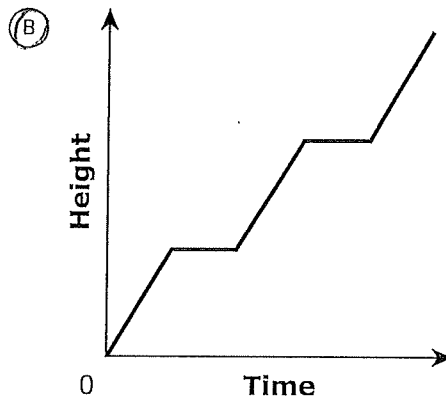
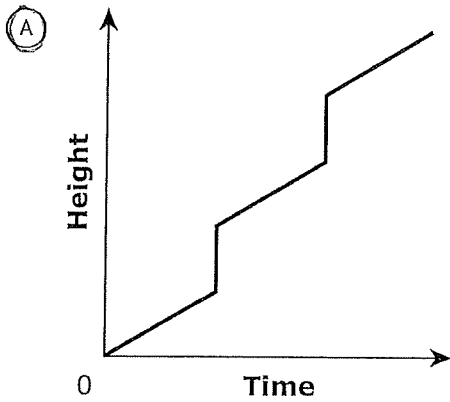
Features of graphs and tables for linear and nonlinear relationships

Identify features of graphs and tables for linear and nonlinear relationships.

For example, using the rise/run to determine slope, coordinates of points, and x/y intercept.

Question:

Kirsten walks up 6 flights of stairs to her office each morning as part of her exercise routine. She walks the first 3 flights, rests for 30 seconds, walks the next 2 flights at the same rate of speed as she walked the first 3 flights, rests again for 30 seconds, and then walks the last flight of stairs at the same rate. Which graph represents Kirsten walking up the stairs?



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NEXT

Slope and a point on a line

Find the equation of a line when given the slope and a point on the line.

Question:

What is the equation of the line that has a slope of -7 and passes through the point (4, 8)?

- (A) $x + 7y = 60$
- (B) $7x + y = 36$
- (C) $x - 7y = -52$
- (D) $7x - y = 20$

PREVIOUS

NEXT

Equation of a line from two points

Find the equation of a line from two points on the line.

Question:

What is the equation of the line that passes through the points $(-3, -2)$ and $(1, 6)$?

(A) $y = 2x + 4$

(B) $y = -2x + 8$

(C) $y = \frac{1}{2}x - \frac{1}{2}$

(D) $y = \frac{1}{2}x - \frac{11}{2}$

PREVIOUS

NEXT

Use slope of a line

Use the slope of a line to solve problems, for example identify whether lines are parallel or perpendicular.

Question:

What is the slope of a line that is perpendicular to $5x - 2y = 1$?

A $\frac{-5}{2}$

B $\frac{-2}{5}$

C $\frac{2}{5}$

D $\frac{5}{2}$

PREVIOUS

NEXT

Functions shown in different ways

Compare functions that are shown in different ways, such as tables, graphs, equations and written descriptions.

Question:

Tim is looking at two websites that allow customers to print their own designs on T-shirts. One website charges \$24 per T-shirt plus \$8 shipping. The other website uses the equation $C = 22n + 12$ to find the total cost, C , of printing n T-shirts. What is the difference in the cost of each website if Tim orders 10 T-shirts?

- A \$2
- B \$16
- C \$20
- D \$24

PREVIOUS

NEXT

Functions in tables and graphs

Recognize a function in a table or graph by determining whether or not there is only one output value for each input value.

Question:

Which table represents a function?

A

| x | y |
|-----|-----|
| 0 | -4 |
| 0 | 4 |
| 2 | -3 |
| 2 | 3 |

B

| x | y |
|-----|-----|
| -5 | 4 |
| 5 | -1 |
| 5 | 3 |
| 1 | 4 |

C

| x | y |
|-----|-----|
| -5 | -4 |
| -4 | -4 |
| -3 | -2 |
| 0 | -1 |

D

| x | y |
|-----|-----|
| -2 | 1 |
| -2 | -3 |
| 2 | 1 |
| 2 | -3 |

PREVIOUS

NEXT

Evaluating functions

Evaluate a function.

For example:

$$f(x) = x^2 - 3x; \text{ find } f(-8)$$

Question:

What is the value of $f(x) = 3x^2 + 4$ when $x = -3$?

(A) -77

(B) -23

(C) 31

(D) 85

PREVIOUS

FINISH

Add, subtract, multiply, and factor linear expressions

Simplify linear expressions by adding, subtracting, multiplying, expanding, and factoring.

For example:

- Expand $4(7x - 2)$
- Factor $4x + 8$

Question:

Subtract.

$$(3x - 4y) - (4x - 3y)$$

- (A) $-x - y$
- (B) $7x - y$
- (C) $-x - 7y$
- (D) $7x - 7y$

NEXT

Evaluate algebraic expressions

Evaluate algebraic expressions by substituting (replacing) variables with numbers.

Question:

A painter uses the expression $35h + 30c$ to determine how much he charges a customer for a job that takes h hours and c cans of paint. His last job required 3 cans of paint and took 15 hours to complete. How much did the painter charge?

- (A) \$540
- (B) \$555
- (C) \$615
- (D) \$630

PREVIOUS

NEXT

Algebraic expressions -- creation

Create algebraic expressions to represent problem situations or word-to-symbol translations.

Question:

In a science experiment, the initial temperature was 55 degrees Fahrenheit, and each hour after, the temperature dropped by 4 degrees. Which expression represents the temperature, in degrees Fahrenheit, after t hours?

A $55 - 4t$

B $55 + 4t$

C $4t + 55$

D $4t - 55$

PREVIOUS

NEXT

Add, subtract, multiply, divide, and factor polynomials

Add, subtract, multiply, divide, and factor polynomials.

For example:

- $(x + 8)(x + 4)$
- Factor $3x^2 - 10x - 8$

Question:

Multiply.

$$(2x - y)(3x + y)$$

- (A) $6x^2 - xy - y^2$
- (B) $5x^2 - xy - y^2$
- (C) $6x^2 - xy - 2y^2$
- (D) $5x^2 - xy - 2y^2$

PREVIOUS

NEXT

Create polynomials from written descriptions

Create polynomials to represent problem situations or word-to-symbol translations.

For example, a triangle has three sides with the following lengths:

$2x + 1$ units, $3x + 5$ units, and $4x - 1$ units

Write an algebraic expression for the perimeter of the triangle in units.

Question:

A rental company carries tables that seat 2, 4, or 8 people. For a wedding, a customer orders x tables that seat 2 people, y tables that seat 4 people, and z tables that seat 8 people. Which expression represents the number of people who could be seated at the tables that the customer orders?

- (A) $2x(4y)(8z)$
- (B) $2x + 4y + 8z$
- (C) $(2 + 4 + 8)(xyz)$
- (D) $(2 + 4 + 8)(x + y + z)$

PREVIOUS

NEXT

Add, subtract, multiply and divide rational expressions

Add, subtract, multiply and divide rational expressions.

Question:

Add.

$$\frac{3}{x} + \frac{x}{x+2}$$

(A) $\frac{3+x}{2x+2}$

(B) $\frac{x+5}{2x+2}$

(C) $\frac{x^2+3x+2}{x(x+2)}$

(D) $\frac{x^2+3x+6}{x(x+2)}$

PREVIOUS

NEXT

Write an expression from a written description

Write an expression from a written description.

A written description of a mathematical expression is shown.

the quotient of the sum of 4 and 2 times a number,
and the difference of 6 less than 3 times the same
number

Question:

Which expression matches the written description?

(A) $\frac{2x + 4}{3x - 6}$

(B) $\frac{2x + 4}{6 - 3x}$

(C) $(2x + 4)(3x - 6)$

(D) $(2x + 4)(6 - 3x)$

PREVIOUS

NEXT

Use linear equations to solve real-world problems

Use linear equations to solve real-world problems. For example, calculate the fuel efficiency of a car at different speeds.

Question:

Lucy is shipping 5 boxes that all weigh the same, and 1 envelope that weighs 7.5 pounds. The total weight of the shipment is 65 pounds. What is the weight, in pounds, of each box?

- (A) 5.5
- (B) 11.5
- (C) 14.5
- (D) 20.5

PREVIOUS

NEXT

Solve a system of two linear equations

Solve a system of linear equations and real-world problems that involve them.

Common techniques include graphing, substitution, or addition to compute a system of two linear equations.

A system of equations is shown.

$$4x + 3y = 8$$

$$4x - 3y = -16$$

Question:

What is the value of x ?

- A -3
- B -1
- C 1
- D 4

PREVIOUS

NEXT

Solve inequalities and graph the answer on a number line

Solve inequalities and real-world problems that involve them, and graph the solutions.

Question:

Isabella saved \$15,000 and bought a car that cost \$12,700. The insurance for the car will cost \$600 per year. How many full years will Isabella be able to pay for car insurance with her remaining savings?

- A 3
- B 4
- C 21
- D 25

PREVIOUS

NEXT

Quadratic equations with one variable

Solve quadratic equations with one variable.

For example, $3x^2 + 2x - 8 = 0$.

Question:

Solve.

$$4x^2 - x - 5 = 0$$

A $x = -1$ and $x = \frac{5}{4}$

B $x = \frac{4}{5}$ and $x = 1$

C $x = -1$ and $x = \frac{4}{5}$

D $x = 1$ and $x = \frac{5}{4}$

PREVIOUS

FINISH

Side lengths of shapes when given the area or perimeter

Find the side lengths of triangles, rectangles, and polygons when given the area or perimeter.

Remember, you will be provided with the math formulas.

Question:

A rectangle has an area of 54 square inches and a length of 6 inches. What is the width, in inches, of the rectangle?

- (A) 9
- (B) 21
- (C) 24
- (D) 48

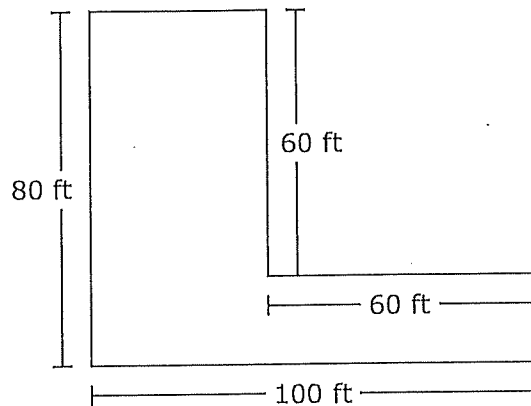
NEXT

Area and perimeter of two-dimensional shapes

Find the area and perimeter of two-dimensional shapes, including triangles, rectangles, polygons, and composite shapes.

Remember, you will be provided with the math formulas.

The Wilson family's back yard is a rectangular plot that has a length of 100 feet and a width of 80 feet. The family planted a garden with a length and width of 60 feet. The family planted a lawn in the remaining area of the back yard, as shown.



Question:

What is the area, in square feet, of the lawn in the Wilson family's back yard?

- (A) 4,400
- (B) 5,200
- (C) 5,600
- (D) 8,000

PREVIOUS

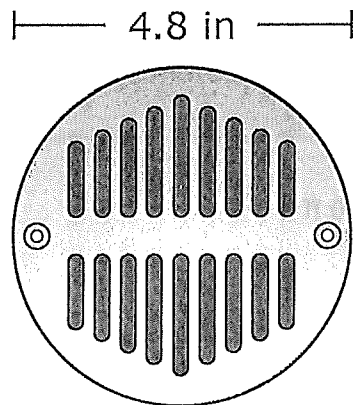
NEXT

Area, circumference, radius, and diameter of a circle

Find the area and circumference of a circle. Find the radius or diameter of a circle when given the area or circumference.

Remember, you will be provided with the math formulas.

Greg installed a circular drain that has a diameter of 4.8 inches.



Question:

To the nearest tenth of an inch, what is circumference of the drain?

- (A) 7.5
- (B) 15.1
- (C) 18.1
- (D) 30.1

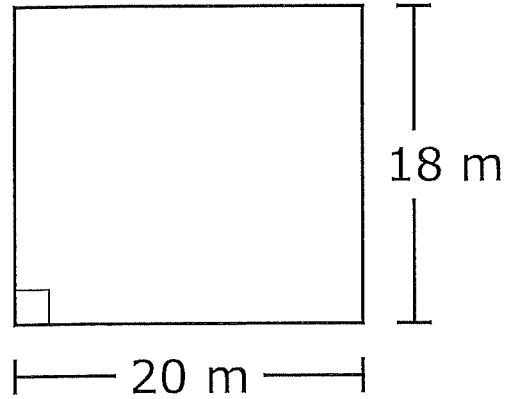
PREVIOUS

NEXT

Pythagorean theorem

Use the Pythagorean theorem $a^2 + b^2 = c^2$ to find a side length in a right triangle.

The foundation of a building is in the shape of a rectangle, with a length of 20 meters (m) and a width of 18 m.



Question:

To the nearest meter, what is the distance from the top left corner of the foundation to the bottom right corner?

- (A) 19
- (B) 27
- (C) 36
- (D) 38

PREVIOUS

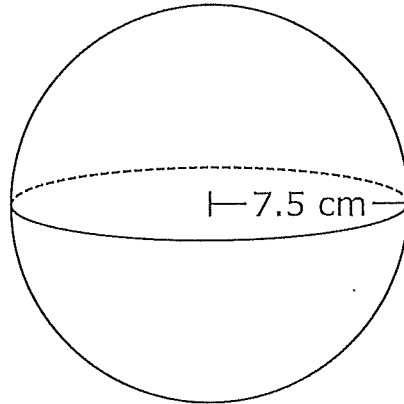
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Volume and surface area of three-dimensional shapes

Find the volume and surface area of three-dimensional shapes, including rectangular and right prisms, cylinders, and right pyramids. Find the side lengths, radius, or diameter of a three-dimensional figure when given the volume or surface area.

Remember, you will be provided with the math formulas.

A sphere has a radius of 7.5 centimeters (cm).



Question:

To the nearest cubic centimeter, what is the volume of the sphere?

- A 236
- B 1,325
- C 1,766
- D 14,130

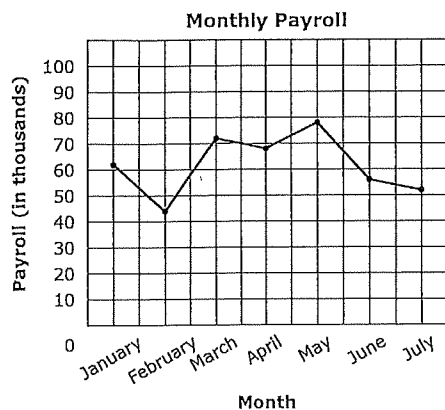
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NEXT

Graphical data including graphs, tables, and more

Construct and explain data from bar graphs, circle graphs, dot plots, histograms, box plots, tables, scatter plots, and line graphs.

The line graph shows the monthly payroll at a large construction company.



Question:

In which month did the monthly payroll decrease the most?

- (A) February
- (B) March
- (C) June
- (D) July

PREVIOUS

NEXT

Mean, median, mode, and range

Find the mean, median, mode, and range of a number set. Find a missing value when given an average.

The manager of an apartment complex ordered the air conditioners in the apartments to be replaced. The list shows how many years each air conditioner had been in service.

12.2, 13.7, 11.9, 13.4, 11.9, 12.3, 12.9, 11.8, 13.3, 13.6

Question:

What is the median number of years that an air conditioner had been in service?

- A 11.9
- B 12.1
- C 12.6
- D 12.7

PREVIOUS

NEXT

Counting techniques

Use counting techniques to solve math problems. For example, count how many different ways objects can be ordered, arranged, or combined.

Question:

A restaurant serves custom-made omelets, where guests select meat, cheese, and vegetables to be added to their omelet. There are 6 vegetables available, and guests may select any 2 vegetables for their omelet. How many different combinations of 2 vegetables are possible?

- (A) 12
- (B) 15
- (C) 30
- (D) 36

PREVIOUS

NEXT

Probability of an event

Find the probability of one or more events happening.

For example, what is the probability of drawing a jack or a king randomly from a deck of cards?

Question:

In a shipment of toys from a manufacturer, the probability that a toy is defective is $\frac{1}{50}$. If Marie selects 2 toys from a shipment, what is the probability that both toys are defective?

A $\frac{1}{25}$

B $\frac{1}{50}$

C $\frac{1}{100}$

D $\frac{1}{2,500}$

PREVIOUS

FINISH