

One-Variable Equations and InequalitiesRecall Steps to Solving Equations/Inequalities

$$3(2x + 5) + 4x = 5x - 5 \quad (1) \text{ Simplify - use distributive property to get rid of grouping symbols.}$$

$$6x + 15 + 4x = 5x - 5 \quad (2) \text{ Simplify - combine like terms.}$$

$$10x + 15 = 5x - 5 \quad (3) \text{ Gather the variables to one side (subtract } 5x \text{ from both sides).}$$

$$5x + 15 = -5 \quad (4) \text{ Isolate the variable - subtract 15 from both sides.}$$

$$5x = -20 \quad (5) \text{ Isolate the variable - divide both sides by 5.}$$

$$x = -4 \quad \text{**To get rid of a } \textit{fraction}, \text{ turn it into a decimal or multiply the ENTIRE equation by its denominator.}$$

(1) The formula $A = \frac{1}{2}bh$ represents the area of a triangle where A represents the area, b is the base of the triangle and h is the height of the triangle. Solve this formula for b .

a. $b = 2A - h$

b. $b = A - \frac{1}{2}h$

c. $b = \frac{A}{2h}$

d. $b = \frac{2A}{h}$

(2) The equation below was solved incorrectly. Study the work below and describe the mistake.

$$5x + 5 = -3x + 3$$

$$2x = -2$$

$$x = -1$$

What is the correct solution to the equation $5x + 5 = -3x + 3$?

(3) Solve the equation for y . $5x - 10y = -40$

(4) Solve the inequality for x .

$$2(2 - x) \leq -3x - 2$$

(5) Solve the proportion for x .

$$\frac{2x+3}{4} = \frac{x}{4}$$

(6) Megan bought 7 charms for \$31.50. Each charm costs the same amount of money. Write an inequality that can be used to find the maximum amount of charms (c) Megan can buy with \$75.

What is the maximum amount of charms Megan can buy with \$75?

(7) Tony works at a bike store. He earns \$300 every week plus \$15 for every bike that he sells. Write an inequality that can be used to determine the number of bikes (b) Tony must sell in one week if he wants to earn a minimum of \$500 for that week.

What is the minimum number of bikes Tony must sell in one week to earn a weekly salary of \$500?

Graphing and Interpreting Linear and Nonlinear Relations

Recall: A function is a relation that has exactly one output (of the range) for each input (of the domain).
A linear function has a constant rate of change. The graph of a linear function is a line.

(8) What is the domain and range of the relation shown in the table below?

X	Y
-1	-5
1	-1
3	3
5	7

Domain:

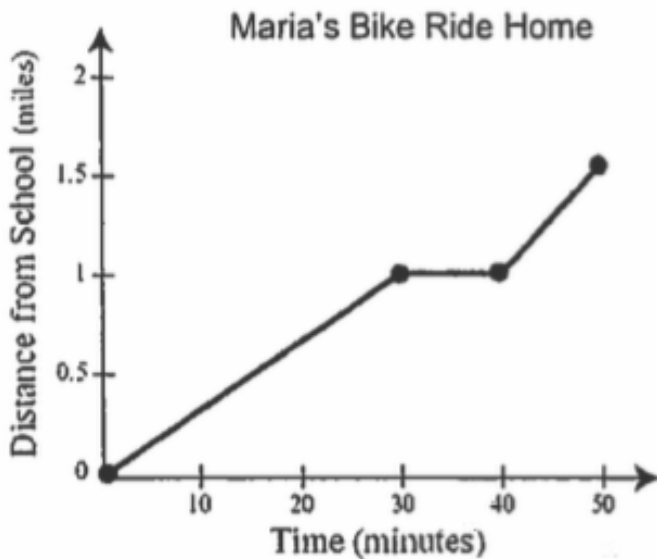
Range:

Is the relation in the table a linear function? If it is, what is the rate of change?

(9) Which relation below is NOT a function?

- a. $\{(-2, 4), (1, 3), (0, 4)\}$
- b. $\{(5, 5), (4, 4), (3, 3)\}$
- c. $\{(-4, 0), (-7, 0), (11, 0)\}$
- d. $\{(1, 4), (2, 5), (1, 7)\}$

(10) Maria rode her bike home from school. The graph shows Maria's distance from school over time.



Describe Maria's bike ride home with respect to time and distance. Be sure to include any changes in speed during the bike ride.

Linear Equations

Recall:

- Slope-intercept form is $y = mx + b$, where $m =$ slope and $b =$ y-intercept.
- The y-intercept is where the graph crosses the y-axis (x-intercept is where it crosses the x-axis).
- You can turn any linear equation into slope-intercept form by solving for y .
- The formula for slope is $m = \frac{y_2 - y_1}{x_2 - x_1}$. You can use point-slope $y - y_1 = m(x - x_1)$ to write equation.
- Standard form is $Ax + By = C$. Find x-intercept by plugging in $y = 0$. Find y-intercept by $x = 0$.

(11) Which equation has a graph with no y-intercept?

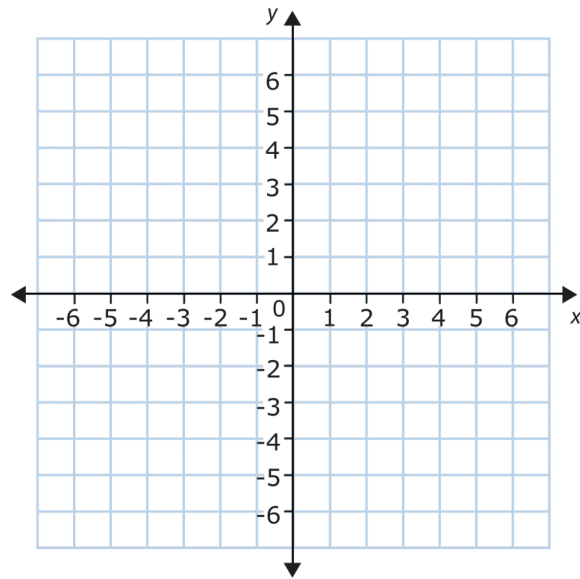
- a. $y = 5$
- b. $x = 1$
- c. $x = y$
- d. $y = -x$

(12) What is the slope, x-intercept, and y-intercept of the graph of the equation $3x + y = 7$?

$m =$ $x - \text{intercept} =$ $b =$

(13) Write an equation of a line that passes through the points $(-2, 5)$ and $(1, 2)$.

(14) Graph $y = \frac{2}{3}x - 1$.



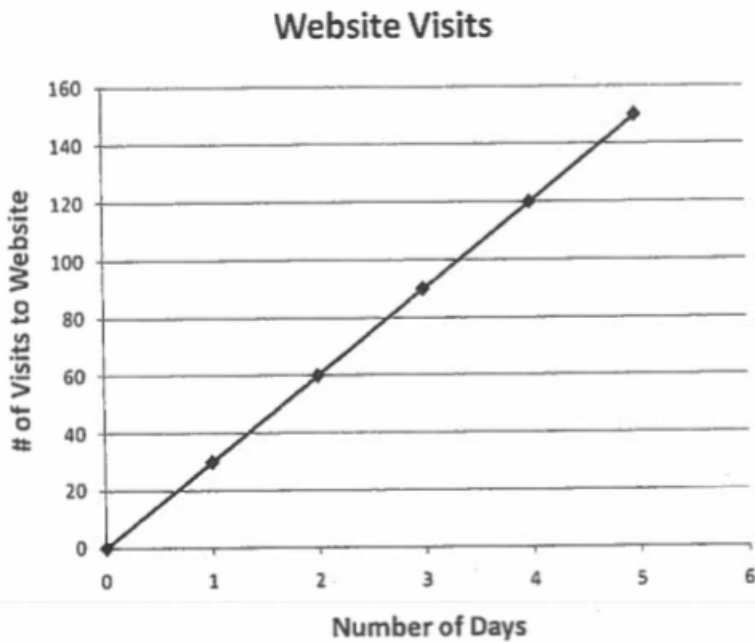
(15) Sue earns \$2 for each CD she sells and \$2.50 for each DVD she sells. Sue earned \$950 last week selling CDs and DVDs. Write a linear equation to represent the number of CDs (c) and DVDs (d) Sue sold last week given that she earned \$950.

If Sue sold 305 CDs last week, how many DVDs did she sell?

(16) Wes bought a pizza with 2 toppings from Bill's Pizza Place for \$11. Lisa bought a pizza with 5 toppings from Bill's Pizza Place for \$14.75. Each topping at Bill's Pizza Place costs the same amount. What is the price per topping at Bill's Pizza Place?

Write an equation that can be used to determine the cost (C), in dollars, of a pizza at Bill's Pizza Place given the number of toppings (T).

(17) The graph below shows the total number of times a certain website was visited over a 5-day period.



What is the slope of the line segment and what does it represent in terms of the situation?

Write an equation that represents the total number of times this website is visited, V , after d days.

If this trend continues, how many times will this website be visited in 30 days?

Systems of Linear Equations

Recall:

Substitution Method

Solve $\begin{cases} 2x - y = 12 \\ x - y = 3 \end{cases}$ by substitution.

$$\begin{cases} 2x - y = 12 \\ x - y = 3 \end{cases} \Rightarrow x = y + 3$$

Subst: $2(y + 3) - y = 12$

$$2y + 6 - y = 12$$

$$y + 6 = 12$$

$$\begin{array}{r} y + 6 = 12 \\ -6 \quad -6 \\ \hline y = 6 \end{array}$$

Back subst: $x = 6 + 3$

$$x = 9$$

Answer: $(9, 6)$

Elimination Method

Solve the system: $\begin{cases} x - y = 1 \\ -4x + 3y = 5 \end{cases}$

$$\begin{array}{r} x - y = 1 \\ -4x + 3y = 5 \end{array} \begin{array}{l} \times(4) \\ \oplus \end{array} \begin{array}{l} 4x - 4y = 4 \\ -4x + 3y = 5 \end{array}$$

$$\begin{array}{r} 4x - 4y = 4 \\ -4x + 3y = 5 \\ \hline -y = 9 \end{array}$$

Back Subst.

$$x - (-9) = 1$$

$$x + 9 = 1$$

$$x = -8$$

ANS: $(-8, -9)$

(18) Solve the system of equations below.

$$-5y + 3x = -16$$

$$10y + 4x = 62$$

What is the x-value in the solution?

- a. 3
- b. 4.6
- c. 5
- d. 6.6

(19) Solve the system of equations below.

$$x = -3y$$

$$3y + 2x = 3$$

What is the value of y in the solution?

- a. -3
- b. -1
- c. 1
- d. 3

(20) Kim bought 4 shirts and 3 pairs of jeans for \$109.85. Jim bought 6 shirts and 1 pair of jeans for \$94.95. Each shirt costs the same amount. Each pair of jeans costs the same amount.

What is the cost, in dollars, for 1 pair of jeans?

(21) Jen is 13 years younger than Andre. The sum of their ages in years is 137. What is Andre's age in years?

Polynomials & Quadratic Functions

Recall:

- Standard Form of a Quadratic Function: $y = ax^2 + bx + c$
- Factor by finding the numbers that add to b and multiply to $a \cdot c$.
- Use your numbers to split the middle. Factor each side. Write your final answer ()().
- The x -value of quadratic x -intercepts are also called zeros, roots, or solutions.
- Find the solutions by factoring. Set each binomial factor equal to 0 and solve.
- Find the x -value of the vertex of a parabola by $h = -\frac{b}{2a}$. Find the y -value (k) by plugging in h .
- Vertex Form of a Quadratic Function: $y = a(h - h)^2 + k$ where (h, k) is the vertex.

22) Which of these shows the following expression factored completely? $6x^2 - 26x - 20$

- a. $(3x + 2)(x - 5)$
- b. $(3x - 2)(x + 5)$
- c. $2(3x + 2)(x - 5)$
- d. $2(3x - 2)(x + 5)$

23) What are the solutions to the quadratic function $f(x) = x^2 + 5x + 6$?

- a. $x = -2$ or $x = -3$
- b. $x = 2$ or $x = 3$
- c. $x = 6$ or $x = -1$
- d. $x = -6$ or $x = 1$

24) What is the vertex of the quadratic function $y = -2x^2 + 8x - 7$? Is it a maximum or minimum?

- a. $(-2, -31)$; maximum
- b. $(-2, -31)$; minimum
- c. $(2, 1)$; minimum
- d. $(2, 1)$; maximum