Unit 1. Building Blocks of Algebra

Dec 7-1:05 PM

Which expression is equivalent to $2(3g - 4) - (8g + 3)$?

(1) $-2g - 1$
(2) $-2g - 5$
(3) $-2g - 7$
(4) $-2g - 11$

Nov 28-10:07 AM

Konnor wants to burn 250 Calories while exercising for 45 minutes at the gym. On the treadmill, he can burn 6 Cal/min. On the stationary bike, he can burn 5 Cal/min.

If t represents the number of minutes on the treadmill and b represents the number of minutes on the stationary bike, which expression represents the number of Calories that Konnor can burn on the stationary bike?

(1) b
(2) $5b$
(3) $45 - b$
(4) $250 - 5b$

Dec 2-8:05 PM

A part of Jennifer's work to solve the equation $2(6x^2 - 3) = 11x^2 - x$ is shown below.

Given: $2(6x^2 - 3) = 11x^2 - x$
Step 1: $12x^2 - 6 = 11x^2 - x$

Which property justifies her first step?

(1) identity property of multiplication
(2) multiplication property of equality
(3) commutative property of multiplication
(4) distributive property of multiplication over subtraction

Dec 2-8:01 PM

Andy has \$310 in his account. Each week, w, he withdraws \$30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

(1) $310 - 8w$
(2) $280 + 30(w - 1)$
(3) $310w - 30$
(4) $280 - 30(w - 1)$

Nov 29-1:46 PM

The formula for the surface area of a right rectangular prism is $A = 2lw + 2hw + 2lh$, where l, w, and h represent the length, width, and height, respectively. Which term of this formula is *not* dependent on the height?

(1) A
(2) $2lw$
(3) $2hw$
(4) $2lh$

Dec 1-3:14 PM

Unit 2. Linear Expressions, Equations, and Inequalities

Dec 7-1:06 PM

When solving the equation $4(3x^2 + 2) - 9 = 8x^2 + 7$, Emily wrote $4(3x^2 + 2) = 8x^2 + 16$ as her first step. Which property justifies Emily's first step?

(1) addition property of equality
(2) commutative property of addition
(3) multiplication property of equality
(4) distributive property of multiplication over addition

Nov 28-9:39 AM

When $3x + 2 \leq 5(x - 4)$ is solved for x, the solution is

(1) $x \leq 3$
(2) $x \geq 3$
(3) $x \leq -11$
(4) $x \geq 11$

Dec 7-12:17 PM

The acidity in a swimming pool is considered normal if the average of three pH readings, p, is defined such that $7.0 < p < 7.8$. If the first two readings are 7.2 and 7.6, which value for the third reading will result in an overall rating of normal?

(1) 6.2
(2) 7.3
(3) 8.6
(4) 8.8

Dec 7-12:16 PM

Michael borrows money from his uncle, who is charging him simple interest using the formula $I = Prt$. To figure out what the interest rate, r, is, Michael rearranges the formula to find r. His new formula is r equals

(1) $\frac{I-P}{t}$
(2) $\frac{P-I}{t}$
(3) $\frac{I}{Pt}$
(4) $\frac{Pt}{I}$

Dec 7-11:50 AM

Which value of x satisfies the equation $\frac{5}{6}\left(\frac{3}{8} - x\right) = 16$?

(1) –19.575
(2) –18.825
(3) –16.3125
(4) –15.6875

Dec 2-8:05 PM

What is the solution to the inequality $2 + \frac{4}{9}x \geq 4 + x$?

(1) $x \leq -\frac{18}{5}$

(2) $x \geq -\frac{18}{5}$

(3) $x \leq \frac{54}{5}$

(4) $x \geq \frac{54}{5}$

Dec 2-8:05 PM

The formula for blood flow rate is given by $F = \frac{p_1 - p_2}{r}$, where F is the flow rate, p_1 the initial pressure, p_2 the final pressure, and r the resistance created by blood vessel size. Which formula can *not* be derived from the given formula?

(1) $p_1 = Fr + p_2$

(2) $p_2 = p_1 - Fr$

(3) $r = F(p_2 - p_1)$

(4) $r = \frac{p_1 - p_2}{F}$

Dec 1-3:23 PM

An equation is given below.

$$4(x - 7) = 0.3(x + 2) + 2.11$$

The solution to the equation is

(1) 8.3

(2) 8.7

(3) 3

(4) −3

Dec 1-3:21 PM

Which value would be a solution for x in the inequality $47 - 4x < 7$?

(1) −13

(2) −10

(3) 10

(4) 11

Dec 1-3:19 PM

Which value of x satisfies the equation $\frac{7}{3}\left(x + \frac{9}{28}\right) = 20$?

(1) 8.25

(2) 8.89

(3) 19.25

(4) 44.92

Nov 28-9:40 AM

What is the solution to $2h + 8 > 3h - 6$?

(1) $h < 14$

(2) $h < \frac{14}{5}$

(3) $h > 14$

(4) $h > \frac{14}{5}$

Nov 28-10:25 PM

Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula $P_1V_1 = P_2V_2$. When the formula is solved for P_2, the result is

(1) $P_1V_1V_2$
(3) $\frac{P_1V_1}{V_2}$
(2) $\frac{V_2}{P_1V_1}$
(4) $\frac{P_1V_2}{V_1}$

Nov 29-1:37 PM

What is the value of x in the equation $\frac{x-2}{3} + \frac{1}{6} = \frac{5}{6}$?

(1) 4
(3) 8
(2) 6
(4) 11

Nov 28-9:40 AM

The inequality $7 - \frac{2}{3}x < x - 8$ is equivalent to

(1) $x > 9$
(3) $x < 9$
(2) $x > -\frac{3}{5}$
(4) $x < -\frac{3}{5}$

Nov 28-9:39 AM

To watch a varsity basketball game, spectators must buy a ticket at the door. The cost of an adult ticket is \$3.00 and the cost of a student ticket is \$1.50. If the number of adult tickets sold is represented by a and student tickets sold by s, which expression represents the amount of money collected at the door from the ticket sales?

(1) $4.50as$
(3) $(3.00a)(1.50s)$
(2) $4.50(a + s)$
(4) $3.00a + 1.50s$

Nov 28-9:33 AM

The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. The radius, r, of the cone may be expressed as

(1) $\sqrt{\frac{3V}{\pi h}}$
(3) $3\sqrt{\frac{V}{\pi h}}$
(2) $\sqrt{\frac{V}{3\pi h}}$
(4) $\frac{1}{3}\sqrt{\frac{V}{\pi h}}$

Nov 28-9:38 AM

John has four more nickels than dimes in his pocket, for a total of \$1.25. Which equation could be used to determine the number of dimes, x, in his pocket?

(1) $0.10(x + 4) + 0.05(x) = \$1.25$
(2) $0.05(x + 4) + 0.10(x) = \$1.25$
(3) $0.10(4x) + 0.05(x) = \$1.25$
(4) $0.05(4x) + 0.10(x) = \$1.25$

Nov 28-9:38 AM

Kendal bought x boxes of cookies to bring to a party. Each box contains 12 cookies. She decides to keep two boxes for herself. She brings 60 cookies to the party. Which equation can be used to find the number of boxes, x, Kendal bought?

(1) $2x - 12 = 60$
(2) $12x - 2 = 60$
(3) $12x - 24 = 60$
(4) $24 - 12x = 60$

Nov 28-10:30 PM

A parking garage charges a base rate of \$3.50 for up to 2 hours, and an hourly rate for each additional hour. The sign below gives the prices for up to 5 hours of parking.

Parking Rates	
2 hours	\$3.50
3 hours	\$9.00
4 hours	\$14.50
5 hours	\$20.00

Which linear equation can be used to find x, the additional hourly parking rate?

(1) $9.00 + 3x = 20.00$
(2) $9.00 + 3.50x = 20.00$
(3) $2x + 3.50 = 14.50$
(4) $2x + 9.00 = 14.50$

Nov 28-10:29 PM

The equation for the volume of a cylinder is $V = \pi r^2 h$. The positive value of r, in terms of h and V, is

(1) $r = \sqrt{\frac{V}{\pi h}}$
(2) $r = \sqrt{V\pi h}$
(3) $r = 2V\pi h$
(4) $r = \frac{V}{2\pi}$

Nov 28-9:37 AM

Connor wants to attend the town carnival. The price of admission to the carnival is \$4.50, and each ride costs an additional 79 cents. If he can spend at most \$16.00 at the carnival, which inequality can be used to solve for r, the number of rides Connor can go on, and what is the maximum number of rides he can go on?

(1) $0.79 + 4.50r \leq 16.00$; 3 rides
(2) $0.79 + 4.50r \leq 16.00$; 4 rides
(3) $4.50 + 0.79r \leq 16.00$; 14 rides
(4) $4.50 + 0.79r \leq 16.00$; 15 rides

Nov 28-9:37 AM

Solve for x algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

If x is a number in the interval $[4,8]$, state all integers that satisfy the given inequality. Explain how you determined these values.

Nov 28-9:39 AM

Given $2x + ax - 7 > -12$, determine the largest integer value of a when $x = -1$.

Nov 28-9:40 AM

Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

Nov 29-1:50 PM

The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.

Nov 28-10:17 PM

Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$

Nov 28-9:40 AM

Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

Nov 28-9:39 AM

Solve the equation below for x in terms of a.

$$4(ax + 3) - 3ax = 25 + 3a$$

Nov 28-10:39 PM

The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.

The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.

Nov 28-9:38 AM

Using the formula for the volume of a cone, express r in terms of V, h, and π.

Dec 5-10:58 AM

Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

Dec 7-12:03 PM

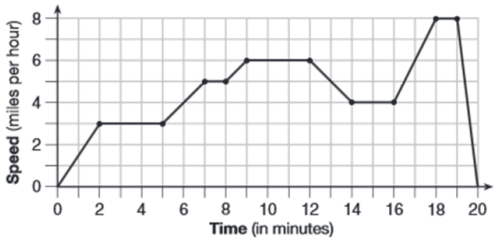
The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.

Dec 7-12:36 PM

Unit 3. Functions

Dec 7-1:05 PM

The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.



Which statement best describes what the jogger was doing during the 9–12 minute interval of her jog?

(1) She was standing still.
(2) She was increasing her speed.
(3) She was decreasing her speed.
(4) She was jogging at a constant rate.

Nov 28-9:32 AM

Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

Dec 7-12:30 PM

A store sells self-serve frozen yogurt sundaes. The function $C(w)$ represents the cost, in dollars, of a sundae weighing w ounces. An appropriate domain for the function would be

(1) integers
(2) rational numbers
(3) nonnegative integers
(4) nonnegative rational numbers

Dec 7-12:28 PM

What is the largest integer, x, for which the value of $f(x) = 5x^4 + 30x^2 + 9$ will be greater than the value of $g(x) = 3^x$?

(1) 7
(2) 8
(3) 9
(4) 10

Dec 7-12:26 PM

The range of the function $f(x) = x^2 + 2x - 8$ is all real numbers

(1) less than or equal to -9
(2) greater than or equal to -9
(3) less than or equal to -1
(4) greater than or equal to -1

Dec 7-12:18 PM

The table below shows the year and the number of households in a building that had high-speed broadband internet access.

Number of Households	11	16	23	33	42	47
Year	2002	2003	2004	2005	2006	2007

For which interval of time was the average rate of change the *smallest*?

(1) 2002 – 2004
(2) 2003 – 2005
(3) 2004 – 2006
(4) 2005 – 2007

Dec 7-12:15 PM

A construction company uses the function $f(p)$, where p is the number of people working on a project, to model the amount of money it spends to complete a project. A reasonable domain for this function would be

(1) positive integers
(2) positive real numbers
(3) both positive and negative integers
(4) both positive and negative real numbers

Dec 7-11:53 AM

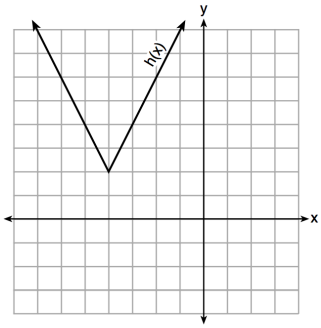
The table below shows the cost of mailing a postcard in different years. During which time interval did the cost increase at the greatest average rate?

Year	1898	1971	1985	2006	2012
Cost (¢)	1	6	14	24	35

(1) 1898–1971
(2) 1971–1985
(3) 1985–2006
(4) 2006–2012

Dec 7-11:53 AM

The function $h(x)$, which is graphed below, and the function $g(x) = 2|x + 4| - 3$ are given.



Which statements about these functions are true?

I. $g(x)$ has a lower minimum value than $h(x)$.
II. For all values of x, $h(x) < g(x)$.
III. For any value of x, $g(x) \neq h(x)$.

(1) I and II, only
(2) I and III, only
(3) II and III, only
(4) I, II, and III

Dec 2-8:07 PM

What is the domain of the relation shown below?

$$\{(4,2),(1,1),(0,0),(1,-1),(4,-2)\}$$

(1) $\{0, 1, 4\}$
(2) $\{-2, -1, 0, 1, 2\}$
(3) $\{-2, -1, 0, 1, 2, 4\}$
(4) $\{-2, -1, 0, 0, 1, 1, 1, 2, 4, 4\}$

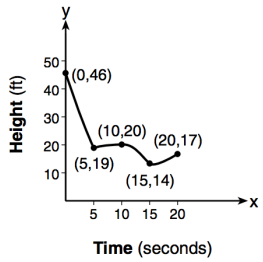
Dec 2-8:04 PM

If $f(x) = \frac{1}{2}x^2 - \left(\frac{1}{4}x + 3\right)$, what is the value of $f(8)$?

(1) 11
(2) 17
(3) 27
(4) 33

Dec 2-8:02 PM

The graph below models the height of a remote-control helicopter over 20 seconds during flight.



Over which interval does the helicopter have the *slowest* average rate of change?

(1) 0 to 5 seconds
(2) 5 to 10 seconds
(3) 10 to 15 seconds
(4) 15 to 20 seconds

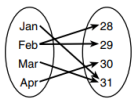
Dec 2-8:02 PM

Which value of x results in equal outputs for $j(x) = 3x - 2$ and $b(x) = |x + 2|$?

(1) -2
(2) 2
(3) $\frac{2}{3}$
(4) 4

Dec 2-8:01 PM

mapping is shown in the diagram below.



his mapping is

) a function, because Feb has two outputs, 28 and 29
) a function, because two inputs, Jan and Mar, result in the output 31
) not a function, because Feb has two outputs, 28 and 29
) not a function, because two inputs, Jan and Mar, result in the output 31

Dec 1-3:17 PM

ynn, Jude, and Anne were given the function $f(x) = -2x^2 + 32$, and hey were asked to find $f(3)$. Lynn's answer was 14, Jude's answer was , and Anne's answer was ±4. Who is correct?

(1) Lynn, only
(2) Jude, only
(3) Anne, only
(4) Both Lynn and Jude

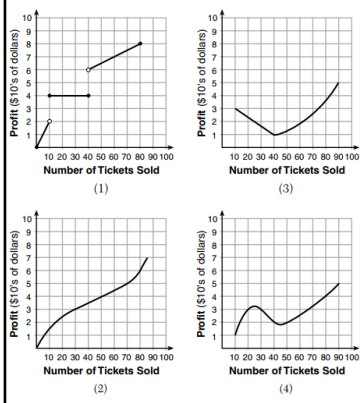
Dec 1-3:16 PM

If $f(n) = (n - 1)^2 + 3n$, which statement is true?

(1) $f(3) = -2$
(2) $f(-2) = 3$
(3) $f(-2) = -15$
(4) $f(-15) = -2$

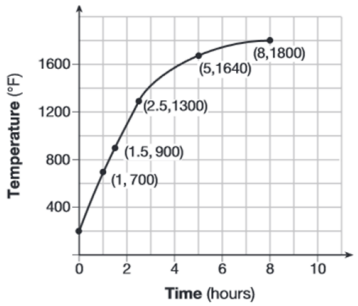
Nov 28-10:24 PM

To keep track of his profits, the owner of a carnival booth decided to model his ticket sales on a graph. He found that his profits only declined when he sold between 10 and 40 tickets. Which graph could represent his profits?



Dec 1-3:13 PM

Firing a piece of pottery in a kiln takes place at different temperatures for different amounts of time. The graph below shows the temperatures in a kiln while firing a piece of pottery after the kiln is preheated to 200°F.



During which time interval did the temperature in the kiln show the greatest average rate of change?

(1) 0 to 1 hour
(2) 1 hour to 1.5 hours
(3) 2.5 hours to 5 hours
(4) 5 hours to 8 hours

Nov 28-9:45 AM

Faith wants to use the formula $C(f) = \frac{5}{9}(f - 32)$ to convert degrees Fahrenheit, f, to degrees Celsius, $C(f)$. If Faith calculated $C(68)$, what would her result be?

(1) 20° Celsius
(2) 20° Fahrenheit
(3) 154° Celsius
(4) 154° Fahrenheit

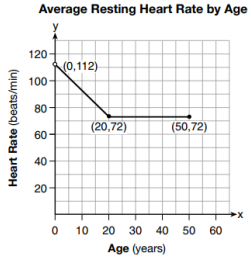
Nov 29-1:41 PM

The daily cost of production in a factory is calculated using $c(x) = 200 + 16x$, where x is the number of complete products manufactured. Which set of numbers best defines the domain of $c(x)$?

(1) integers
(2) positive real numbers
(3) positive rational numbers
(4) whole numbers

Nov 29-1:46 PM

A graph of average resting heart rates is shown below. The average resting heart rate for adults is 72 beats per minute, but doctors consider resting rates from 60-100 beats per minute within normal range.



Which statement about average resting heart rates is *not* supported by the graph?

(1) A 10-year-old has the same average resting heart rate as a 20-year-old.

(2) A 20-year-old has the same average resting heart rate as a 30-year-old.

(3) A 40-year-old may have the same average resting heart rate for ten years.

(4) The average resting heart rate for teenagers steadily decreases.

Nov 29-1:47 PM

Joey enlarged a 3-inch by 5-inch photograph on a copy machine. He enlarged it four times. The table below shows the area of the photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (square inches)	15	18.8	23.4	29.3	36.6

What is the average rate of change of the area from the original photograph to the fourth enlargement, to the *nearest tenth*?

(1) 4.3 (3) 5.4

(2) 4.5 (4) 6.0

Nov 28-9:45 AM

An online company lets you download songs for \$0.99 each after you have paid a \$5 membership fee. Which domain would be most appropriate to calculate the cost to download songs?

(1) rational numbers greater than zero

(2) whole numbers greater than or equal to one

(3) integers less than or equal to zero

(4) whole numbers less than or equal to one

Nov 28-10:32 PM

A store sells self-serve frozen yogurt sundaes. The function $C(w)$ represents the cost, in dollars, of a sundae weighing w ounces. An appropriate domain for the function would be

(1) integers

(2) rational numbers

(3) nonnegative integers

(4) nonnegative rational numbers

Nov 28-10:12 PM

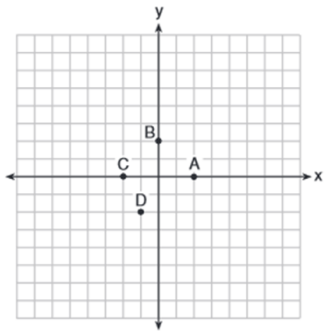
What is the largest integer, x, for which the value of $f(x) = 5x^4 + 30x^2 + 9$ will be greater than the value of $g(x) = 3^x$?

(1) 7 (3) 9

(2) 8 (4) 10

Nov 28-10:11 PM

The graph of $y = f(x)$ is shown below.



Which point could be used to find $f(2)$?

(1) A (3) C

(2) B (4) D

Nov 28-9:44 AM

Let f be a function such that $f(x) = 2x - 4$ is defined on the domain $2 \le x \le 6$. The range of this function is

(1) $0 \le y \le 8$
(2) $0 \le y < \infty$
(3) $2 \le y \le 6$
(4) $-\infty < y < \infty$

Nov 28-9:44 AM

As x increases beyond 25, which function will have the largest value?

(1) $f(x) = 1.5^x$
(2) $g(x) = 1.5x + 3$
(3) $h(x) = 1.5x^2$
(4) $k(x) = 1.5x^3 + 1.5x^2$

Nov 28-10:31 PM

If $f(x) = \frac{1}{3}x + 9$, which statement is always true?

(1) $f(x) < 0$
(2) $f(x) > 0$
(3) If $x < 0$, then $f(x) < 0$.
(4) If $x > 0$, then $f(x) > 0$.

Nov 28-9:44 AM

Which table represents a function?

(1)

x	2	4	2	4
f(x)	3	5	7	9

(3)

x	3	5	7	9
f(x)	2	4	2	4

(2)

x	0	−1	0	1
f(x)	0	1	−1	0

(4)

x	0	1	−1	0
f(x)	0	−1	0	1

Nov 28-9:44 AM

Which domain would be the most appropriate set to use for a function that predicts the number of household online-devices in terms of the number of people in the household?

(1) integers
(2) whole numbers
(3) irrational numbers
(4) rational numbers

Nov 28-9:45 AM

An astronaut drops a rock off the edge of a cliff on the Moon. The distance, $d(t)$, in meters, the rock travels after t seconds can be modeled by the function $d(t) = 0.8t^2$. What is the average speed, in meters per second, of the rock between 5 and 10 seconds after it was dropped?

(1) 12
(2) 20
(3) 60
(4) 80

Nov 28-9:45 AM

The table below shows the average diameter of a pupil in a person's eye as he or she grows older.

Age (years)	Average Pupil Diameter (mm)
20	4.7
30	4.3
40	3.9
50	3.5
60	3.1
70	2.7
80	2.3

What is the average rate of change, in millimeters per year, of a person's pupil diameter from age 20 to age 80?

(1) 2.4 (3) −2.4

(2) 0.04 (4) −0.04

Nov 28-9:45 AM

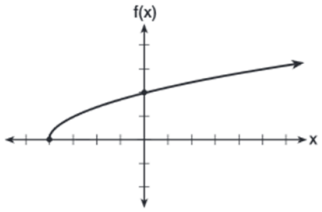
Officials in a town use a function, C, to analyze traffic patterns. $C(n)$ represents the rate of traffic through an intersection where n is the number of observed vehicles in a specified time interval. What would be the most appropriate domain for the function?

(1) $\{\ldots -2, -1, 0, 1, 2, 3, \ldots\}$ (3) $\left\{0, \frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}\right\}$

(2) $\{-2, -1, 0, 1, 2, 3\}$ (4) $\{0, 1, 2, 3, \ldots\}$

Nov 28-9:45 AM

The graph of the function $f(x) = \sqrt{x+4}$ is shown below.



The domain of the function is

(1) $\{x|x > 0\}$ (3) $\{x|x > -4\}$

(2) $\{x|x \geq 0\}$ (4) $\{x|x \geq -4\}$

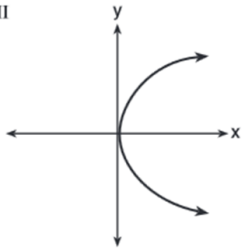
Nov 28-9:43 AM

Which representations are functions?

I

x	y
2	6
3	−12
4	7
5	5
2	−6

III



II $\{(1,1), (2,1), (3,2), (4,3), (5,5), (6,8), (7,13)\}$ IV $y = 2x + 1$

(1) I and II (3) III, only

(2) II and IV (4) IV, only

Nov 28-9:43 AM

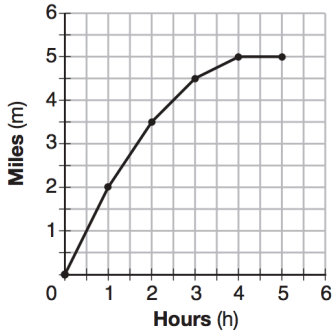
If $f(x) = 3^x$ and $g(x) = 2x + 5$, at which value of x is $f(x) < g(x)$?

(1) −1 (3) −3

(2) 2 (4) 4

Nov 28-9:49 AM

The graph below shows the distance in miles, m, hiked from a camp in h hours.



Which hourly interval had the greatest rate of change?

(1) hour 0 to hour 1 (3) hour 2 to hour 3

(2) hour 1 to hour 2 (4) hour 3 to hour 4

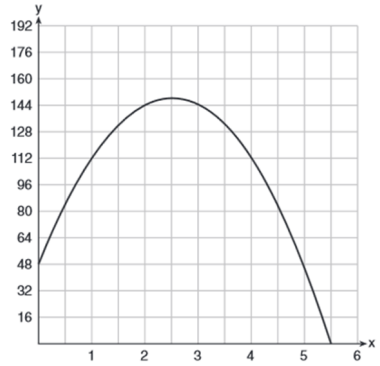
Nov 28-10:22 PM

If $f(x) = \frac{\sqrt{2x+3}}{6x-5}$, then $f\left(\frac{1}{2}\right) =$

(1) 1
(3) -1
(2) -2
(4) $-\frac{13}{3}$

Nov 28-9:43 AM

A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph below shows the height, y, of the ball from the ground after x seconds.

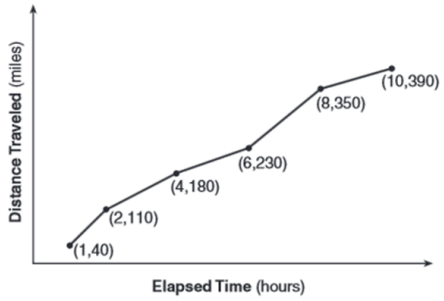


For which interval is the ball's height always *decreasing*?

(1) $0 \le x \le 2.5$
(3) $2.5 < x < 5.5$
(2) $0 < x < 5.5$
(4) $x \ge 2$

Nov 28-9:46 AM

The Jamison family kept a log of the distance they traveled during a trip, as represented by the graph below.



During which interval was their average speed the greatest?

(1) the first hour to the second hour
(2) the second hour to the fourth hour
(3) the sixth hour to the eighth hour
(4) the eighth hour to the tenth hour

Nov 28-9:46 AM

Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Nov 29-1:52 PM

A function is shown in the table below.

x	f(x)
–4	2
–1	–4
0	–2
3	16

If included in the table, which ordered pair, $(-4,1)$ or $(1,-4)$, would result in a relation that is no longer a function? Explain your answer.

Nov 28-9:44 AM

A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

Nov 29-1:52 PM

Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

Nov 28-10:13 PM

The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

Nov 28-9:43 AM

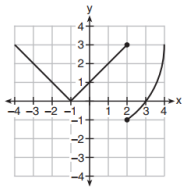
The function f has a domain of {1, 3, 5, 7} and a range of {2, 4, 6}.

Could f be represented by {(1,2), (3,4), (5,6), (7,2)}?

Justify your answer.

Nov 28-9:44 AM

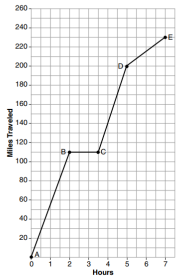
Marcel claims that the graph below represents a function.



State whether Marcel is correct. Justify your answer.

Dec 7-12:00 PM

The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



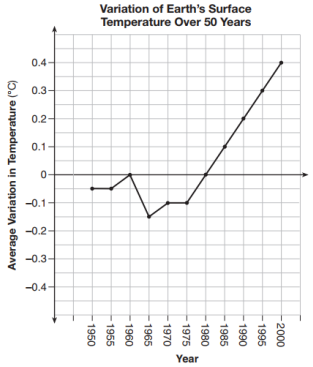
Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

Explain what might have happened in the interval between *B* and *C*.

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

Dec 1-3:27 PM

The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

Dec 7-12:02 PM

Unit 4. Linear Functions and Arithmetic Sequences

Dec 7-1:07 PM

The owner of a small computer repair business has one employee, who is paid an hourly rate of \$22. The owner estimates his weekly profit using the function $P(x) = 8600 - 22x$. In this function, x represents the number of

(1) computers repaired per week
(2) hours worked per week
(3) customers served per week
(4) days worked per week

Nov 28-9:33 AM

In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is

(1) −11 (3) 16
(2) −8 (4) 19

Dec 7-12:19 PM

Dan took 12.5 seconds to run the 100-meter dash. He calculated the time to be approximately

(1) 0.2083 minute (3) 0.2083 hour
(2) 750 minutes (4) 0.52083 hour

Dec 7-12:17 PM

The tables below show the values of four different functions for given values of x.

x	f(x)
1	12
2	19
3	26
4	33

x	g(x)
1	−1
2	1
3	5
4	13

x	h(x)
1	9
2	12
3	17
4	24

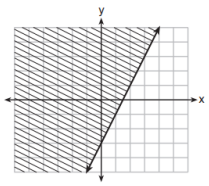
x	k(x)
1	−2
2	4
3	14
4	28

Which table represents a linear function?

(1) $f(x)$ (3) $h(x)$
(2) $g(x)$ (4) $k(x)$

Dec 7-12:16 PM

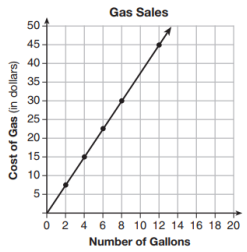
Which inequality is represented by the graph below?



(1) $y \leq 2x - 3$ (3) $y \leq -3x + 2$
(2) $y \geq 2x - 3$ (4) $y \geq -3x + 2$

Dec 7-11:50 AM

The graph below was created by an employee at a gas station.

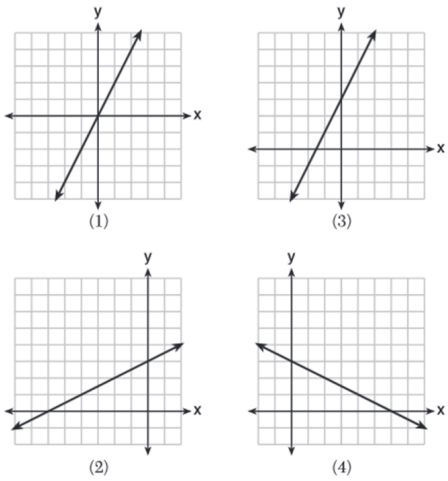


Which statement can be justified by using the graph?

(1) If 10 gallons of gas was purchased, $35 was paid.
(2) For every gallon of gas purchased, $3.75 was paid.
(3) For every 2 gallons of gas purchased, $5.00 was paid.
(4) If zero gallons of gas were purchased, zero miles were driven.

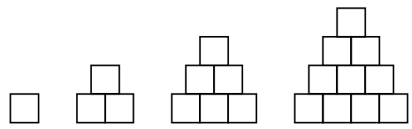
Dec 7-11:48 AM

Which graph shows a line where each value of y is three more than half of x?



Nov 28-9:37 AM

A sequence of blocks is shown in the diagram below.



This sequence can be defined by the recursive function $a_1 = 1$ and $a_n = a_{n-1} + n$. Assuming the pattern continues, how many blocks will there be when $n = 7$?

(1) 13
(2) 21
(3) 28
(4) 36

Dec 2-8:06 PM

A plumber has a set fee for a house call and charges by the hour for repairs. The total cost of her services can be modeled by $c(t) = 125t + 95$.

Which statements about this function are true?

I. A house call fee costs $95.
II. The plumber charges $125 per hour.
III. The number of hours the job takes is represented by t.

(1) I and II, only
(2) I and III, only
(3) II and III, only
(4) I, II, and III

Dec 2-8:04 PM

One characteristic of all linear functions is that they change by

(1) equal factors over equal intervals
(2) unequal factors over equal intervals
(3) equal differences over equal intervals
(4) unequal differences over equal intervals

Dec 1-3:22 PM

A construction worker needs to move 120 ft^3 of dirt by using a wheelbarrow. One wheelbarrow load holds 8 ft^3 of dirt and each load takes him 10 minutes to complete. One correct way to figure out the number of hours he would need to complete this job is

(1) $\frac{120\ ft^3}{1} \cdot \frac{10\ min}{1\ load} \cdot \frac{60\ min}{1\ hr} \cdot \frac{1\ load}{8\ ft^3}$

(2) $\frac{120\ ft^3}{1} \cdot \frac{60\ min}{1\ hr} \cdot \frac{8\ ft^3}{10\ min} \cdot \frac{1}{1\ load}$

(3) $\frac{120\ ft^3}{1} \cdot \frac{1\ load}{10\ min} \cdot \frac{8\ ft^3}{1\ load} \cdot \frac{1\ hr}{60\ min}$

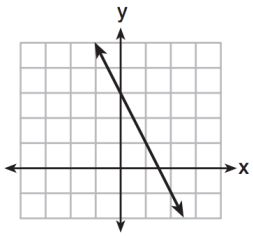
(4) $\frac{120\ ft^3}{1} \cdot \frac{1\ load}{8\ ft^3} \cdot \frac{10\ min}{1\ load} \cdot \frac{1\ hr}{60\ min}$

Dec 1-3:22 PM

Which function has a constant rate of change equal to -3?

x	y
0	2
1	5
2	8
3	11

(1)



(3)

$\{(1,5), (2,2), (3,-5), (4,4)\}$
(2)

$2y = -6x + 10$
(4)

Nov 28-10:30 PM

In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1) $a_1 = 49; a_n = a_{n-1} + 21$
(2) $a_1 = 0; a_n = 49a_{n-1} + 21$
(3) $a_1 = 21; a_n = a_{n-1} + 49$
(4) $a_1 = 0; a_n = 21a_{n-1} + 49$

Nov 29-1:40 PM

Patricia is trying to compare the average rainfall of New York to that of Arizona. A comparison between these two states for the months of July through September would be best measured in

(1) feet per hour
(2) inches per hour
(3) inches per month
(4) feet per month

Nov 28-10:27 PM

A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation $D = 280 - 59t$ can be used to represent the distance, D, from Buffalo after t hours. In this equation, the 59 represents the

(1) car's distance from Albany
(2) speed of the car
(3) distance between Buffalo and Albany
(4) number of hours driving

Nov 29-1:41 PM

What is the *minimum* value of the function $y = |x + 3| - 2$?

(1) -2
(2) 2
(3) 3
(4) -3

Nov 29-1:43 PM

Which function defines the sequence $-6, -10, -14, -18, \ldots$, where $f(6) = -26$?

(1) $f(x) = -4x - 2$
(2) $f(x) = 4x - 2$
(3) $f(x) = -x + 32$
(4) $f(x) = x - 26$

Nov 28-10:27 PM

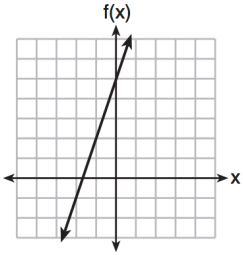
Which function has the greatest y-intercept?

(1) $f(x) = 3x$

(2) $2x + 3y = 12$

(3) the line that has a slope of 2 and passes through $(1,-4)$

(4)



Nov 28-10:28 PM

Which chart could represent the function $f(x) = -2x + 6$?

(1)

x	f(x)
0	6
2	10
4	14
6	18

(3)

x	f(x)
0	8
2	10
4	12
6	14

(2)

x	f(x)
0	4
2	6
4	8
6	10

(4)

x	f(x)
0	6
2	2
4	–2
6	–6

Nov 28-10:23 PM

The solution of an equation with two variables, x and y, is

(1) the set of all x values that make $y = 0$

(2) the set of all y values that make $x = 0$

(3) the set of all ordered pairs, (x,y), that make the equation true

(4) the set of all ordered pairs, (x,y), where the graph of the equation crosses the y-axis

Nov 28-10:23 PM

The value of the x-intercept for the graph of $4x - 5y = 40$ is

(1) 10

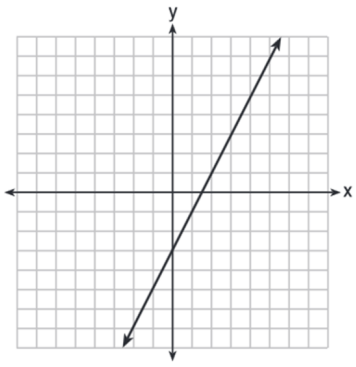
(2) $\frac{4}{5}$

(3) $-\frac{4}{5}$

(4) -8

Nov 28-9:47 AM

Which function has the same y-intercept as the graph below?



(1) $y = \frac{12 - 6x}{4}$

(2) $27 + 3y = 6x$

(3) $6y + x = 18$

(4) $y + 3 = 6x$

Nov 28-9:46 AM

A typical cell phone plan has a fixed base fee that includes a certain amount of data and an overage charge for data use beyond the plan. A cell phone plan charges a base fee of \$62 and an overage charge of \$30 per gigabyte of data that exceed 2 gigabytes. If C represents the cost and g represents the total number of gigabytes of data, which equation could represent this plan when more than 2 gigabytes are used?

(1) $C = 30 + 62(2 - g)$

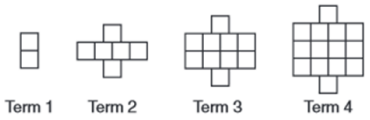
(2) $C = 30 + 62(g - 2)$

(3) $C = 62 + 30(2 - g)$

(4) $C = 62 + 30(g - 2)$

Nov 28-9:47 AM

A pattern of blocks is shown below.



If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the nth term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

(1) I and II
(2) I and III
(3) II and III
(4) III, only

Nov 28-9:47 AM

A sunflower is 3 inches tall at week 0 and grows 2 inches each week. Which function(s) shown below can be used to determine the height, $f(n)$, of the sunflower in n weeks?

I. $f(n) = 2n + 3$
II. $f(n) = 2n + 3(n - 1)$
III. $f(n) = f(n - 1) + 2$ where $f(0) = 3$

(1) I and II
(2) II, only
(3) III, only
(4) I and III

Nov 28-9:44 AM

Which recursively defined function has a first term equal to 10 and a common difference of 4?

(1) $f(1) = 10$
$f(x) = f(x - 1) + 4$
(2) $f(1) = 4$
$f(x) = f(x - 1) + 10$
(3) $f(1) = 10$
$f(x) = 4f(x - 1)$
(4) $f(1) = 4$
$f(x) = 10f(x - 1)$

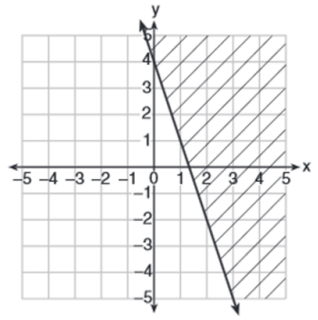
Nov 28-9:43 AM

The graph of a linear equation contains the points (3,11) and (−2,1). Which point also lies on the graph?

(1) (2,1)
(2) (2,4)
(3) (2,6)
(4) (2,9)

Nov 28-9:42 AM

Which inequality is represented in the graph below?



(1) $y \geq -3x + 4$
(2) $y \leq -3x + 4$
(3) $y \geq -4x - 3$
(4) $y \leq -4x - 3$

Nov 28-9:42 AM

In 2013, the United States Postal Service charged \$0.46 to mail a letter weighing up to 1 oz. and \$0.20 per ounce for each additional ounce. Which function would determine the cost, in dollars, $c(z)$, of mailing a letter weighing z ounces where z is an integer greater than 1?

(1) $c(z) = 0.46z + 0.20$
(2) $c(z) = 0.20z + 0.46$
(3) $c(z) = 0.46(z - 1) + 0.20$
(4) $c(z) = 0.20(z - 1) + 0.46$

Nov 28-9:37 AM

Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

$$\frac{40\text{ yd}}{4.5\text{ sec}} \cdot \frac{3\text{ ft}}{1\text{ yd}} \cdot \frac{5280\text{ ft}}{1\text{ mi}} \cdot \frac{60\text{ sec}}{1\text{ min}} \cdot \frac{60\text{ min}}{1\text{ hr}}$$

Which ratio is *incorrectly* written to convert his speed?

(1) $\frac{3\text{ ft}}{1\text{ yd}}$

(2) $\frac{5280\text{ ft}}{1\text{ mi}}$

(3) $\frac{60\text{ sec}}{1\text{ min}}$

(4) $\frac{60\text{ min}}{1\text{ hr}}$

Nov 28-9:32 AM

A cell phone company charges \$60.00 a month for up to 1 gigabyte of data. The cost of additional data is \$0.05 per megabyte. If d represents the number of additional megabytes used and c represents the total charges at the end of the month, which linear equation can be used to determine a user's monthly bill?

(1) $c = 60 - 0.05d$

(2) $c = 60.05d$

(3) $c = 60d - 0.05$

(4) $c = 60 + 0.05d$

Nov 28-9:38 AM

A company that manufactures radios first pays a start-up cost, and then spends a certain amount of money to manufacture each radio. If the cost of manufacturing r radios is given by the function $c(r) = 5.25r + 125$, then the value 5.25 best represents

(1) the start-up cost

(2) the profit earned from the sale of one radio

(3) the amount spent to manufacture each radio

(4) the average number of radios manufactured

Nov 28-9:50 AM

A satellite television company charges a one-time installation fee and a monthly service charge. The total cost is modeled by the function $y = 40 + 90x$. Which statement represents the meaning of each part of the function?

(1) y is the total cost, x is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

(2) y is the total cost, x is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.

(3) x is the total cost, y is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.

(4) x is the total cost, y is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

Nov 28-9:50 AM

Which table of values represents a linear relationship?

x	f(x)
−1	−3
0	−2
1	1
2	6
3	13

(1)

x	f(x)
−1	−3
0	−1
1	1
2	3
3	5

(3)

x	f(x)
−1	$\frac{1}{2}$
0	1
1	2
2	4
3	8

(2)

x	f(x)
−1	−1
0	0
1	1
2	8
3	27

(4)

Nov 28-9:49 AM

Which situation could be modeled by using a linear function?

(1) a bank account balance that grows at a rate of 5% per year, compounded annually

(2) a population of bacteria that doubles every 4.5 hours

(3) the cost of cell phone service that charges a base amount plus 20 cents per minute

(4) the concentration of medicine in a person's body that decays by a factor of one-third every hour

Nov 28-9:49 AM

The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

(1) The commercial costs \$0 to produce and \$110 per airing up to \$900.

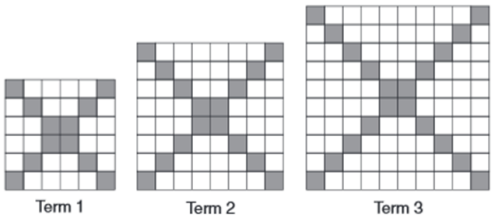
(2) The commercial costs \$110 to produce and \$900 each time it is aired.

(3) The commercial costs \$900 to produce and \$110 each time it is aired.

(4) The commercial costs \$1010 to produce and can air an unlimited number of times.

Nov 28-9:50 AM

The diagrams below represent the first three terms of a sequence.



Assuming the pattern continues, which formula determines a_n, the number of shaded squares in the nth term?

(1) $a_n = 4n + 12$ (3) $a_n = 4n + 4$

(2) $a_n = 4n + 8$ (4) $a_n = 4n + 2$

Nov 28-9:50 AM

The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1, which is an equation for the nth term of this sequence?

(1) $a_n = 8n + 10$ (3) $a_n = 16n + 10$

(2) $a_n = 8n - 14$ (4) $a_n = 16n - 38$

Nov 28-9:49 AM

Rowan has \$50 in a savings jar and is putting in \$5 every week. Jonah has \$10 in his own jar and is putting in \$15 every week. Each of them plots his progress on a graph with time on the horizontal axis and amount in the jar on the vertical axis. Which statement about their graphs is true?

(1) Rowan's graph has a steeper slope than Jonah's.

(2) Rowan's graph always lies above Jonah's.

(3) Jonah's graph has a steeper slope than Rowan's.

(4) Jonah's graph always lies above Rowan's.

Nov 28-9:36 AM

The cost of a pack of chewing gum in a vending machine is \$0.75. The cost of a bottle of juice in the same machine is \$1.25. Julia has \$22.00 to spend on chewing gum and bottles of juice for her team and she must buy seven packs of chewing gum. If b represents the number of bottles of juice, which inequality represents the maximum number of bottles she can buy?

(1) $0.75b + 1.25(7) \geq 22$ (3) $0.75(7) + 1.25b \geq 22$

(2) $0.75b + 1.25(7) \leq 22$ (4) $0.75(7) + 1.25b \leq 22$

Nov 28-9:36 AM

Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day d.

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

Nov 28-9:36 AM

Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

Nov 29-1:52 PM

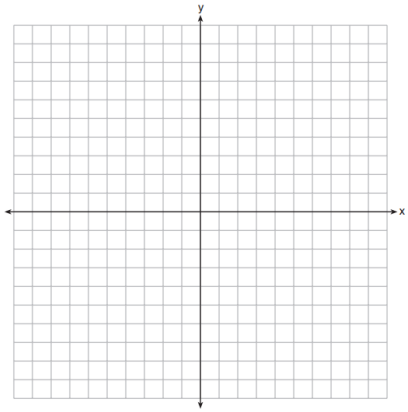
Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

Day (n)	1	2	3	4	5
Height (cm)	3.0	4.5	6.0	7.5	9.0

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the nth day.

Nov 28-9:47 AM

Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.



Nov 29-1:51 PM

A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

Nov 29-1:50 PM

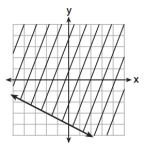
Caitlin has a movie rental card worth $175. After she rents the first movie, the card's value is $172.25. After she rents the second movie, its value is $169.50. After she rents the third movie, the card is worth $166.75.

Assuming the pattern continues, write an equation to define $A(n)$, the amount of money on the rental card after n rentals.

Caitlin rents a movie every Friday night. How many weeks in a row can she afford to rent a movie, using her rental card only? Explain how you arrived at your answer.

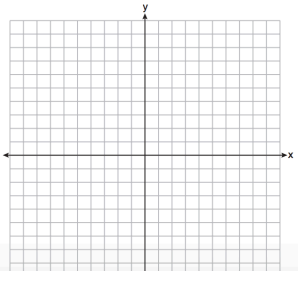
Nov 28-9:48 AM

Shawn incorrectly graphed the inequality $-x - 2y \geq 8$ as shown below.



Explain Shawn's mistake.

Graph the inequality correctly on the set of axes below.



Nov 28-10:40 PM

Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

Nov 29-1:54 PM

Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

Nov 28-10:16 PM

During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

Nov 28-10:16 PM

An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

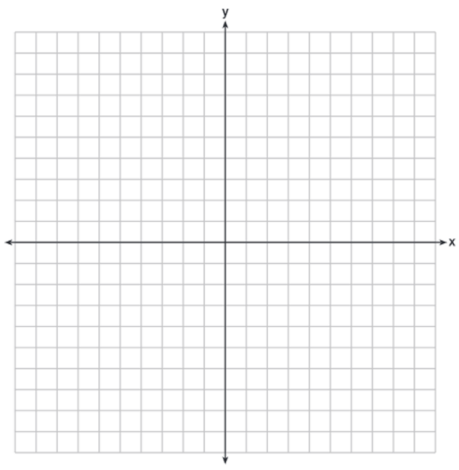
Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

Nov 28-10:20 PM

Alex is selling tickets to a school play. An adult ticket costs \$6.50 and a student ticket costs \$4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

Nov 28-9:47 AM

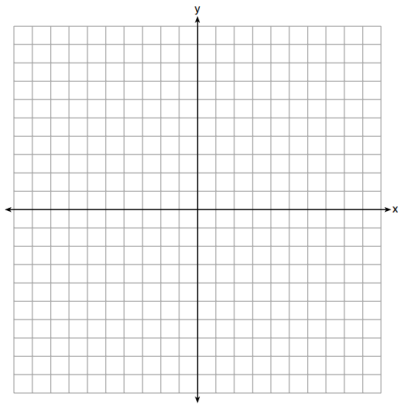
On the set of axes below, draw the graph of the equation $y = -\frac{3}{4}x + 3$.



Is the point $(3,2)$ a solution to the equation? Explain your answer based on the graph drawn.

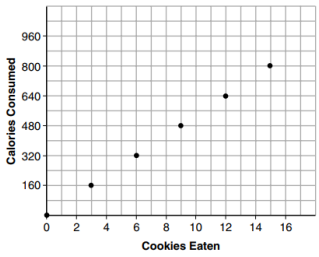
Nov 28-9:43 AM

Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



Dec 1-3:25 PM

Samantha purchases a package of sugar cookies. The nutrition label states that each serving size of 3 cookies contains 160 Calories. Samantha creates the graph below showing the number of cookies eaten and the number of Calories consumed.



Explain why it is appropriate for Samantha to draw a line through the points on the graph.

Dec 5-10:59 AM

A two-inch-long grasshopper can jump a horizontal distance of 40 inches. An athlete, who is five feet nine, wants to cover a distance of one mile by jumping. If this person could jump at the same ratio of body-length to jump-length as the grasshopper, determine, to the *nearest jump*, how many jumps it would take this athlete to jump one mile.

Dec 7-10:14 AM

Zeke and six of his friends are going to a baseball game. Their combined money totals $28.50. At the game, hot dogs cost $1.25 each, hamburgers cost $2.50 each, and sodas cost $0.50 each. Each person buys one soda. They spend all $28.50 on food and soda.

Write an equation that can determine the number of hot dogs, x, and hamburgers, y, Zeke and his friends can buy.

Dec 7-10:29 AM

The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership.

State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

Dec 7-12:02 PM

Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

Dec 7-12:34 PM

During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

Dec 7-12:34 PM

An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

Dec 7-12:39 PM

Unit 5. Systems of Linear Equations and Inequalities

Dec 7-1:07 PM

Which point is a solution to the system below?

$$2y < -12x + 4$$
$$y < -6x + 4$$

(1) $\left(1,\frac{1}{2}\right)$ (3) $\left(-\frac{1}{2},5\right)$

(2) (0,6) (4) (−3,2)

Nov 29-1:45 PM

The graphs of the functions $f(x) = |x - 3| + 1$ and $g(x) = 2x + 1$ are drawn. Which statement about these functions is true?

1) The solution to $f(x) = g(x)$ is 3.
2) The solution to $f(x) = g(x)$ is 1.
3) The graphs intersect when $y = 1$.
4) The graphs intersect when $x = 3$.

Dec 7-12:28 PM

The line represented by the equation $4y + 2x = 33.6$ shares a solution point with the line represented by the table below.

x	y
−5	3.2
−2	3.8
2	4.6
4	5
11	6.4

The solution for this system is

(1) (−14.0,−1.4) (3) (1.9,4.6)

(2) (−6.8,5.0) (4) (6.0,5.4)

Dec 7-12:24 PM

The Celluloid Cinema sold 150 tickets to a movie. Some of these were child tickets and the rest were adult tickets. A child ticket cost $7.75 and an adult ticket cost $10.25. If the cinema sold $1470 worth of tickets, which system of equations could be used to determine how many adult tickets, a, and how many child tickets, c, were sold?

(1) $a + c = 150$
$10.25a + 7.75c = 1470$

(2) $a + c = 1470$
$10.25a + 7.75c = 150$

(3) $a + c = 150$
$7.75a + 10.25c = 1470$

(4) $a + c = 1470$
$7.75a + 10.25c = 150$

Dec 7-12:16 PM

Which pair of equations could *not* be used to solve the following equations for x and y?

$$4x + 2y = 22$$
$$-2x + 2y = -8$$

(1) $4x + 2y = 22$
$2x - 2y = 8$

(2) $4x + 2y = 22$
$-4x + 4y = -16$

(3) $12x + 6y = 66$
$6x - 6y = 24$

(4) $8x + 4y = 44$
$-8x + 8y = -8$

Dec 7-11:58 AM

Given the functions $h(x) = \frac{1}{2}x + 3$ and $j(x) = |x|$, which value of x makes $h(x) = j(x)$?

(1) -2

(2) 2

(3) 3

(4) -6

Dec 7-11:54 AM

Which system of equations does *not* have the same solution as the system below?

$$4x + 3y = 10$$
$$-6x - 5y = -16$$

(1) $-12x - 9y = -30$
$12x + 10y = 32$

(2) $20x + 15y = 50$
$-18x - 15y = -48$

(3) $24x + 18y = 60$
$-24x - 20y = -64$

(4) $40x + 30y = 100$
$36x + 30y = -96$

Dec 5-10:54 AM

Jordan works for a landscape company during his summer vacation. He is paid $12 per hour for mowing lawns and $14 per hour for planting gardens. He can work a maximum of 40 hours per week, and would like to earn at least $250 this week. If m represents the number of hours mowing lawns and g represents the number of hours planting gardens, which system of inequalities could be used to represent the given conditions?

(1) $m + g \leq 40$
$12m + 14g \geq 250$

(2) $m + g \geq 40$
$12m + 14g \leq 250$

(3) $m + g \leq 40$
$12m + 14g \leq 250$

(4) $m + g \geq 40$
$12m + 14g \geq 250$

Dec 1-3:18 PM

What is the solution to the system of equations below?

$$y = 2x + 8$$
$$3(-2x + y) = 12$$

(1) no solution

(2) infinite solutions

(3) $(-1,6)$

(4) $\left(\frac{1}{2}, 9\right)$

Dec 1-3:17 PM

A system of equations is given below.

$$x + 2y = 5$$
$$2x + y = 4$$

Which system of equations does *not* have the same solution?

(1) $3x + 6y = 15$
$2x + y = 4$

(2) $4x + 8y = 20$
$2x + y = 4$

(3) $x + 2y = 5$
$6x + 3y = 12$

(4) $x + 2y = 5$
$4x + 2y = 12$

Nov 28-10:33 PM

Alicia has invented a new app for smart phones that two companies are interested in purchasing for a 2-year contract.

Company *A* is offering her \$10,000 for the first month and will increase the amount each month by \$5000.

Company *B* is offering \$500 for the first month and will double their payment each month from the previous month.

Monthly payments are made at the end of each month. For which monthly payment will company *B*'s payment first exceed company *A*'s payment?

(1) 6
(2) 7
(3) 8
(4) 9

Nov 28-9:48 AM

The graphs of the functions $f(x) = |x - 3| + 1$ and $g(x) = 2x + 1$ are drawn. Which statement about these functions is true?

(1) The solution to $f(x) = g(x)$ is 3.
(2) The solution to $f(x) = g(x)$ is 1.
(3) The graphs intersect when $y = 1$.
(4) The graphs intersect when $x = 3$.

Nov 28-10:12 PM

The line represented by the equation $4y + 2x = 33.6$ shares a solution point with the line represented by the table below.

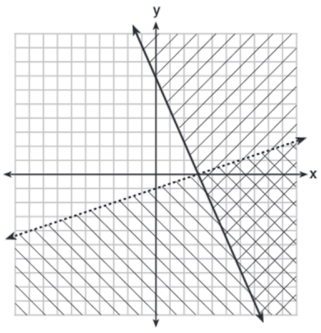
x	y
–5	3.2
–2	3.8
2	4.6
4	5
11	6.4

The solution for this system is

(1) $(-14.0, -1.4)$
(2) $(-6.8, 5.0)$
(3) $(1.9, 4.6)$
(4) $(6.0, 5.4)$

Nov 28-10:10 PM

What is one point that lies in the solution set of the system of inequalities graphed below?

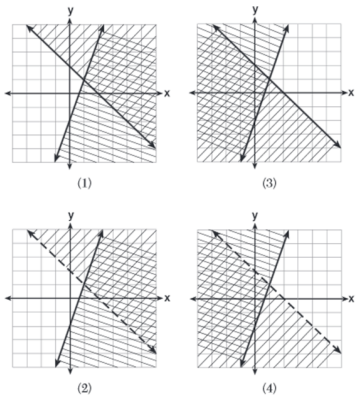


(1) (7,0)
(2) (3,0)
(3) (0,7)
(4) (−3,5)

Nov 28-9:43 AM

Given: $y + x > 2$
$y \leq 3x - 2$

Which graph shows the solution of the given set of inequalities?



Nov 28-9:43 AM

Two functions, $y = |x - 3|$ and $3x + 3y = 27$, are graphed on the same set of axes. Which statement is true about the solution to the system of equations?

1) (3,0) is the solution to the system because it satisfies the equation $y = |x - 3|$.
2) (9,0) is the solution to the system because it satisfies the equation $3x + 3y = 27$.
3) (6,3) is the solution to the system because it satisfies both equations.
4) (3,0), (9,0), and (6,3) are the solutions to the system of equations because they all satisfy at least one of the equations.

Nov 28-9:42 AM

Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?

(1) 11
(2) 18
(3) 65
(4) 100

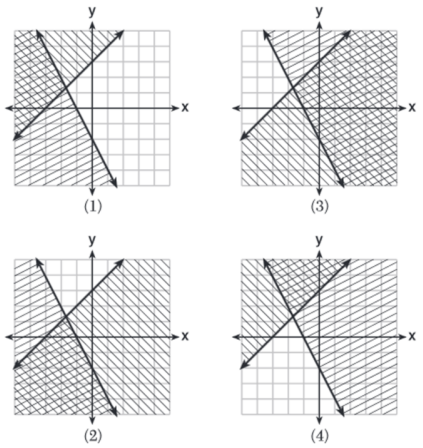
Nov 28-9:41 AM

If $f(x) = x^2 - 2x - 8$ and $g(x) = \frac{1}{4}x - 1$, for which values of x is $f(x) = g(x)$?

(1) -1.75 and -1.438
(2) -1.75 and 4
(3) -1.438 and 0
(4) 4 and 0

Nov 28-9:41 AM

Which graph represents the solution of $y \leq x + 3$ and $y \geq -2x - 2$?



Nov 28-9:41 AM

Which system of equations has the same solution as the system below?

$$2x + 2y = 16$$
$$3x - y = 4$$

(1) $2x + 2y = 16$, $6x - 2y = 4$
(2) $2x + 2y = 16$, $6x - 2y = 8$
(3) $x + y = 16$, $3x - y = 4$
(4) $6x + 6y = 48$, $6x + 2y = 8$

Nov 28-9:41 AM

Last week, a candle store received \$355.60 for selling 20 candles. Small candles sell for \$10.98 and large candles sell for \$27.98. How many large candles did the store sell?

(1) 6
(2) 8
(3) 10
(4) 12

Nov 28-9:41 AM

During the 2010 season, football player McGee's earnings, m, were 0.005 million dollars more than those of his teammate Fitzpatrick's earnings, f. The two players earned a total of 3.95 million dollars. Which system of equations could be used to determine the amount each player earned, in millions of dollars?

(1) $m + f = 3.95$
$m + 0.005 = f$

(2) $m - 3.95 = f$
$f + 0.005 = m$

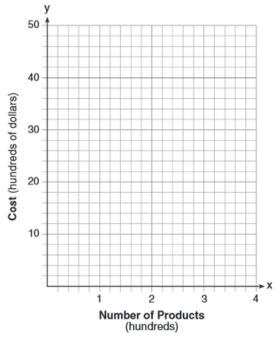
(3) $f - 3.95 = m$
$m + 0.005 = f$

(4) $m + f = 3.95$
$f + 0.005 = m$

Nov 28-9:37 AM

A company is considering building a manufacturing plant. They determine the weekly production cost at site A to be $A(x) = 3x^2$ while the production cost at site B is $B(x) = 8x + 3$, where x represents the number of products, *in hundreds*, and $A(x)$ and $B(x)$ are the production costs, *in hundreds of dollars*.

Graph the production cost functions on the set of axes below and label them site A and site B.



State the positive value(s) of x for which the production costs at the two sites are equal.
Explain how you determined your answer.

Nov 28-9:43 AM

A drama club is selling tickets to the spring musical. The auditorium holds 200 people. Tickets cost $12 at the door and $8.50 if purchased in advance. The drama club has a goal of selling at least $1000 worth of tickets to Saturday's show.

Write a system of inequalities that can be used to model this scenario.

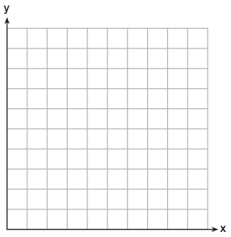
If 50 tickets are sold in advance, what is the minimum number of tickets that must be sold at the door so that the club meets its goal? Justify your answer.

Nov 28-10:40 PM

Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for $19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for $24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

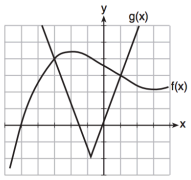
On the set of axes below, graph the system of equations.



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

Nov 28-10:21 PM

The graph below shows two functions, $f(x)$ and $g(x)$. State all the values of x for which $f(x) = g(x)$.



Nov 28-10:38 PM

Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Nov 29-1:55 PM

Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

Nov 29-1:53 PM

In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

Nov 29-1:49 PM

Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

Nov 29-1:53 PM

On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^3, & x > -1 \end{cases}$$

How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

Nov 28-10:20 PM

For a class picnic, two teachers went to the same store to purchase drinks. One teacher purchased 18 juice boxes and 32 bottles of water, and spent $19.92. The other teacher purchased 14 juice boxes and 26 bottles of water, and spent $15.76.

Write a system of equations to represent the costs of a juice box, j, and a bottle of water, w.

Kara said that the juice boxes might have cost 52 cents each and that the bottles of water might have cost 33 cents each. Use your system of equations to justify that Kara's prices are *not* possible.

Solve your system of equations to determine the actual cost, in dollars, of each juice box and each bottle of water.

Nov 28-10:41 PM

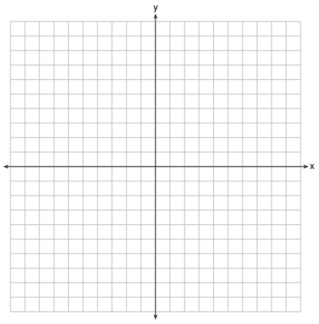
The sum of two numbers, x and y, is more than 3. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below.

Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

Nov 28-10:19 PM

Let $f(x) = -2x^3$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

Nov 28-11:07 AM

Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.

Nov 28-9:41 AM

Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

Nov 28-9:37 AM

Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$ $12x + 5y = 21$	$8x + 9y = 48$ $-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

Nov 28-9:41 AM

An animal shelter spends \$2.35 per day to care for each cat and \$5.50 per day to care for each dog. Pat noticed that the shelter spent \$89.50 caring for cats and dogs on Wednesday.

Write an equation to represent the possible numbers of cats and dogs that could have been at the shelter on Wednesday.

Pat said that there might have been 8 cats and 14 dogs at the shelter on Wednesday. Are Pat's numbers possible? Use your equation to justify your answer.

Later, Pat found a record showing that there were a total of 22 cats and dogs at the shelter on Wednesday. How many cats were at the shelter on Wednesday?

Nov 28-9:38 AM

A gardener is planting two types of trees:

Type A is three feet tall and grows at a rate of 15 inches per year.

Type B is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

Nov 28-9:37 AM

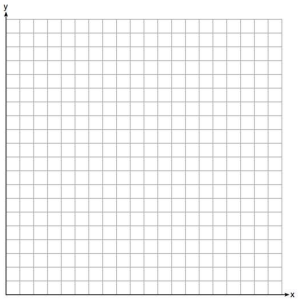
If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

Dec 1-3:25 PM

Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

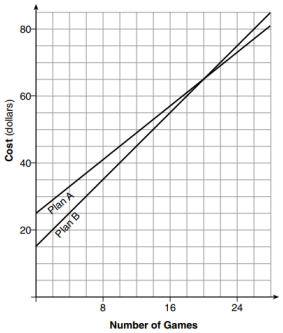
Graph this system of equations on the set of axes below.



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

Dec 1-3:29 PM

The graph below models the cost of renting video games with a membership in Plan A and Plan B.



Explain why Plan B is the better choice for Dylan if he only has \$50 to spend on video games, including a membership fee.

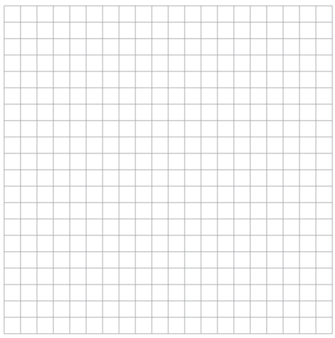
Bobby wants to spend \$65 on video games, including a membership fee. Which plan should he choose? Explain your answer.

Dec 5-10:58 AM

Solve the following system of inequalities graphically on the grid below and label the solution S.

$3x + 4y > 20$

$x < 3y - 18$



Is the point (3,7) in the solution set? Explain your answer.

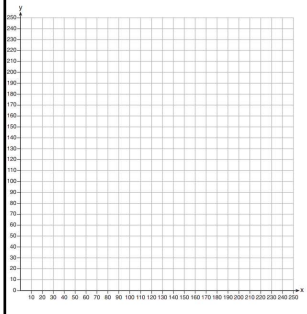
Dec 7-10:18 AM

The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

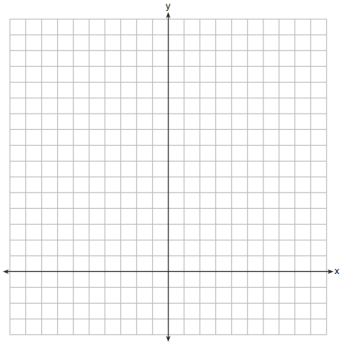
Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.



Dec 7-12:07 PM

The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below.



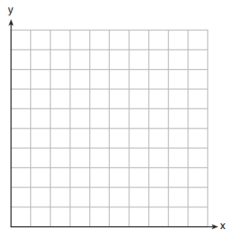
Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

Dec 7-12:39 PM

Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for $19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for $24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

On the set of axes below, graph the system of equations.



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

Dec 7-12:40 PM

Unit 6. Exponents, Exponents, and More Exponents

Dec 7-1:09 PM

The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is

(1) 17%
(2) 1.7%
(3) 1.017%
(4) 0.017%

Nov 28-9:33 AM

A student invests $500 for 3 years in a savings account that earns 4% interest per year. No further deposits or withdrawals are made during this time. Which statement does *not* yield the correct balance in the account at the end of 3 years?

(1) $500(1.04)^3$
(2) $500(1 - .04)^3$
(3) $500(1 + .04)(1 + .04)(1 + .04)$
(4) $500 + 500(.04) + 520(.04) + 540.8(.04)$

Dec 7-12:23 PM

The growth of a certain organism can be modeled by $C(t) = 10(1.029)^{24t}$, where $C(t)$ is the total number of cells after t hours. Which function is approximately equivalent to $C(t)$?

(1) $C(t) = 240(.083)^{24t}$
(2) $C(t) = 10(.083)^t$
(3) $C(t) = 10(1.986)^t$
(4) $C(t) = 240(1.986)^{\frac{t}{24}}$

Dec 7-12:19 PM

The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0

Determine whether $t(x)$ is linear or exponential. Explain your answer.

Dec 7-12:00 PM

Grisham is considering the three situations below.

I. For the first 28 days, a sunflower grows at a rate of 3.5 cm per day.

II. The value of a car depreciates at a rate of 15% per year after it is purchased.

III. The amount of bacteria in a culture triples every two days during an experiment.

Which of the statements describes a situation with an equal difference over an equal interval?

(1) I, only
(2) II, only
(3) I and III
(4) II and III

Dec 7-12:00 PM

The range of the function defined as $y = 5^x$ is

(1) $y < 0$
(2) $y > 0$
(3) $y \leq 0$
(4) $y \geq 0$

Dec 7-11:57 AM

Which recursively defined function represents the sequence 3, 7, 15, 31, ...?

(1) $f(1) = 3,\ f(n+1) = 2^{f(n)} + 3$
(2) $f(1) = 3,\ f(n+1) = 2^{f(n)} - 1$
(3) $f(1) = 3,\ f(n+1) = 2f(n) + 1$
(4) $f(1) = 3,\ f(n+1) = 3f(n) - 2$

Dec 7-11:57 AM

Which function is shown in the table below?

x	f(x)
−2	$\frac{1}{9}$
−1	$\frac{1}{3}$
0	1
1	3
2	9
3	27

(1) $f(x) = 3x$
(2) $f(x) = x + 3$
(3) $f(x) = -x^3$
(4) $f(x) = 3^x$

Dec 7-11:54 AM

The equation $A = 1300(1.02)^7$ is being used to calculate the amount of money in a savings account. What does 1.02 represent in this equation?

(1) 0.02% decay
(2) 0.02% growth
(3) 2% decay
(4) 2% growth

Dec 7-11:51 AM

For a recently released movie, the function $y = 119.67(0.61)^x$ models the revenue earned, y, in millions of dollars each week, x, for several weeks after its release.

Based on the equation, how much more money, in millions of dollars, was earned in revenue for week 3 than for week 5?

(1) 37.27
(2) 27.16
(3) 17.06
(4) 10.11

Dec 7-11:49 AM

Determine and state whether the sequence 1, 3, 9, 27,... displays exponential behavior. Explain how you arrived at your decision.

Dec 5-10:57 AM

The Ebola virus has an infection rate of 11% per day as compared to the SARS virus, which has a rate of 4% per day.

If there were one case of Ebola and 30 cases of SARS initially reported to authorities and cases are reported each day, which statement is true?

(1) At day 10 and day 53 there are more Ebola cases.

(2) At day 10 and day 53 there are more SARS cases.

(3) At day 10 there are more SARS cases, but at day 53 there are more Ebola cases.

(4) At day 10 there are more Ebola cases, but at day 53 there are more SARS cases.

Dec 5-10:38 AM

Mario's \$15,000 car depreciates in value at a rate of 19% per year. The value, V, after t years can be modeled by the function $V = 15{,}000(0.81)^t$. Which function is equivalent to the original function?

(1) $V = 15{,}000(0.9)^{9t}$

(2) $V = 15{,}000(0.9)^{2t}$

(3) $V = 15{,}000(0.9)^{\frac{t}{9}}$

(4) $V = 15{,}000(0.9)^{\frac{t}{2}}$

Dec 2-8:06 PM

The highest possible grade for a book report is 100. The teacher deducts 10 points for each day the report is late.

Which kind of function describes this situation?

(1) linear

(2) quadratic

(3) exponential growth

(4) exponential decay

Dec 2-8:06 PM

If a population of 100 cells triples every hour, which function represents $p(t)$, the population after t hours?

(1) $p(t) = 3(100)^t$

(2) $p(t) = 100(3)^t$

(3) $p(t) = 3t + 100$

(4) $p(t) = 100t + 3$

Dec 2-8:06 PM

Given the function $f(n)$ defined by the following:

$f(1) = 2$

$f(n) = -5f(n - 1) + 2$

Which set could represent the range of the function?

(1) $\{2, 4, 6, 8, \ldots\}$

(2) $\{2, -8, 42, -208, \ldots\}$

(3) $\{-8, -42, -208, 1042, \ldots\}$

(4) $\{-10, 50, -250, 1250, \ldots\}$

Dec 1-3:21 PM

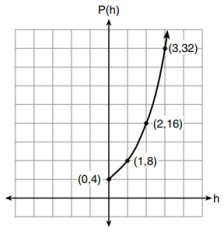
Anne invested $1000 in an account with a 1.3% annual interest rate. She made no deposits or withdrawals on the account for 2 years. If interest was compounded annually, which equation represents the balance in the account after the 2 years?

(1) $A = 1000(1 - 0.013)^2$ (3) $A = 1000(1 - 1.3)^2$

(2) $A = 1000(1 + 0.013)^2$ (4) $A = 1000(1 + 1.3)^2$

Dec 1-3:18 PM

Vinny collects population data, $P(h)$, about a specific strain of bacteria over time in hours, h, as shown in the graph below.



Which equation represents the graph of $P(h)$?

(1) $P(h) = 4(2)^h$ (3) $P(h) = 3h^2 + 0.2h + 4.2$

(2) $P(h) = \frac{46}{5}h + \frac{6}{5}$ (4) $P(h) = \frac{2}{3}h^3 - h^2 + 3h + 4$

Dec 1-3:17 PM

A student invests $500 for 3 years in a savings account that earns 4% interest per year. No further deposits or withdrawals are made during this time. Which statement does *not* yield the correct balance in the account at the end of 3 years?

(1) $500(1.04)^3$

(2) $500(1 - .04)^3$

(3) $500(1 + .04)(1 + .04)(1 + .04)$

(4) $500 + 500(.04) + 520(.04) + 540.8(.04)$

Nov 28-10:09 PM

A computer application generates a sequence of musical notes using the function $f(n) = 6(16)^n$, where n is the number of the note in the sequence and $f(n)$ is the note frequency in hertz. Which function will generate the same note sequence as $f(n)$?

(1) $g(n) = 12(2)^{4n}$ (3) $p(n) = 12(4)^{2n}$

(2) $h(n) = 6(2)^{4n}$ (4) $k(n) = 6(8)^{2n}$

Nov 29-1:44 PM

Which scenario represents exponential growth?

1) A water tank is filled at a rate of 2 gallons/minute.

2) A vine grows 6 inches every week.

3) A species of fly doubles its population every month during the summer.

4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

Nov 29-1:42 PM

The 2014 winner of the Boston Marathon runs as many as 120 miles per week. During the last few weeks of his training for an event, his mileage can be modeled by $M(w) = 120(.90)^{w-1}$, where w represents the number of weeks since training began. Which statement is true about the model $M(w)$?

1) The number of miles he runs will increase by 90% each week.

2) The number of miles he runs will be 10% of the previous week.

3) $M(w)$ represents the total mileage run in a given week.

4) w represents the number of weeks left until his marathon.

Nov 29-1:49 PM

The table below represents the function F.

x	3	4	6	7	8
$F(x)$	9	17	65	129	257

The equation that represents this function is

(1) $F(x) = 3^x$
(2) $F(x) = 3x$
(3) $F(x) = 2^x + 1$
(4) $F(x) = 2x + 3$

Nov 28-9:49 AM

The table below shows the average yearly balance in a savings account where interest is compounded annually. No money is deposited or withdrawn after the initial amount is deposited.

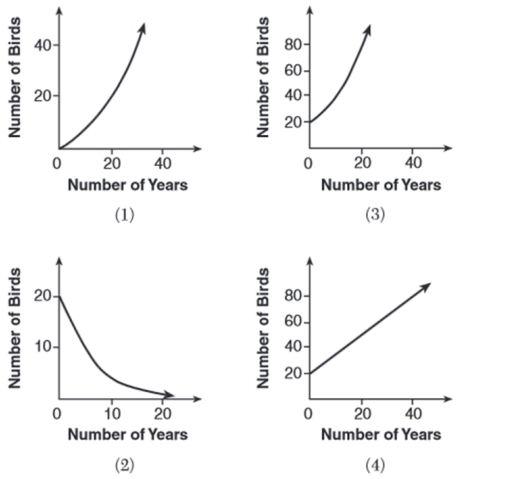
Year	Balance, in Dollars
0	380.00
10	562.49
20	832.63
30	1232.49
40	1824.39
50	2700.54

Which type of function best models the given data?

(1) linear function with a negative rate of change
(2) linear function with a positive rate of change
(3) exponential decay function
(4) exponential growth function

Nov 28-9:49 AM

A population that initially has 20 birds approximately doubles every 10 years. Which graph represents this population growth?



Nov 28-9:49 AM

The table below shows the temperature, $T(m)$, of a cup of hot chocolate that is allowed to chill over several minutes, m.

Time, m (minutes)	0	2	4	6	8
Temperature, T(m) (°F)	150	108	78	56	41

Which expression best fits the data for $T(m)$?

(1) $150(0.85)^m$
(2) $150(1.15)^m$
(3) $150(0.85)^{m-1}$
(4) $150(1.15)^{m-1}$

Nov 28-10:30 PM

A laboratory technician studied the population growth of a colony of bacteria. He recorded the number of bacteria every other day, as shown in the partial table below.

t (time, in days)	0	2	4
f(t) (bacteria)	25	15,625	9,765,625

Which function would accurately model the technician's data?

(1) $f(t) = 25^t$
(2) $f(t) = 25^{t+1}$
(3) $f(t) = 25t$
(4) $f(t) = 25(t + 1)$

Nov 28-9:49 AM

The country of Benin in West Africa has a population of 9.05 million people. The population is growing at a rate of 3.1% each year. Which function can be used to find the population 7 years from now?

(1) $f(t) = (9.05 \times 10^6)(1 - 0.31)^7$
(2) $f(t) = (9.05 \times 10^6)(1 + 0.31)^7$
(3) $f(t) = (9.05 \times 10^6)(1 + 0.031)^7$
(4) $f(t) = (9.05 \times 10^6)(1 - 0.031)^7$

Nov 28-9:49 AM

Krystal was given $3000 when she turned 2 years old. Her parents invested it at a 2% interest rate compounded annually. No deposits or withdrawals were made. Which expression can be used to determine how much money Krystal had in the account when she turned 18?

(1) $3000(1 + 0.02)^{16}$
(2) $3000(1 - 0.02)^{16}$
(3) $3000(1 + 0.02)^{18}$
(4) $3000(1 - 0.02)^{18}$

Nov 28-9:47 AM

If $f(1) = 3$ and $f(n) = -2f(n - 1) + 1$, then $f(5) =$

(1) -5
(2) 11
(3) 21
(4) 43

Nov 28-9:44 AM

Milton has his money invested in a stock portfolio. The value, $v(x)$, of his portfolio can be modeled with the function $v(x) = 30{,}000(0.78)^x$, where x is the number of years since he made his investment. Which statement describes the rate of change of the value of his portfolio?

(1) It decreases 78% per year.
(2) It decreases 22% per year.
(3) It increases 78% per year.
(4) It increases 22% per year.

Nov 28-10:34 PM

The value in dollars, $v(x)$, of a certain car after x years is represented by the equation $v(x) = 25{,}000(0.86)^x$. To the *nearest dollar*, how much more is the car worth after 2 years than after 3 years?

(1) 2589
(2) 6510
(3) 15,901
(4) 18,490

Nov 28-9:44 AM

If a sequence is defined recursively by $f(0) = 2$ and $f(n + 1) = -2f(n) + 3$ for $n \geq 0$, then $f(2)$ is equal to

(1) 1
(2) -11
(3) 5
(4) 17

Nov 28-9:44 AM

Some banks charge a fee on savings accounts that are left inactive for an extended period of time. The equation $y = 5000(0.98)^x$ represents the value, y, of one account that was left inactive for a period of x years.

What is the y-intercept of this equation and what does it represent?

(1) 0.98, the percent of money in the account initially
(2) 0.98, the percent of money in the account after x years
(3) 5000, the amount of money in the account initially
(4) 5000, the amount of money in the account after x years

Nov 28-9:45 AM

Miriam and Jessica are growing bacteria in a laboratory. Miriam uses the growth function $f(t) = n^{2t}$ while Jessica uses the function $g(t) = n^{4t}$, where n represents the initial number of bacteria and t is the time, in hours. If Miriam starts with 16 bacteria, how many bacteria should Jessica start with to achieve the same growth over time?

(1) 32
(2) 16
(3) 8
(4) 4

Nov 28-9:34 AM

The breakdown of a sample of a chemical compound is represented by the function $p(t) = 300(0.5)^t$, where $p(t)$ represents the number of milligrams of the substance and t represents the time, in years. In the function $p(t)$, explain what 0.5 and 300 represent.

Nov 28-9:51 AM

Consider the pattern of squares shown below:

Which type of model, linear or exponential, should be used to determine how many squares are in the nth pattern? Explain your answer.

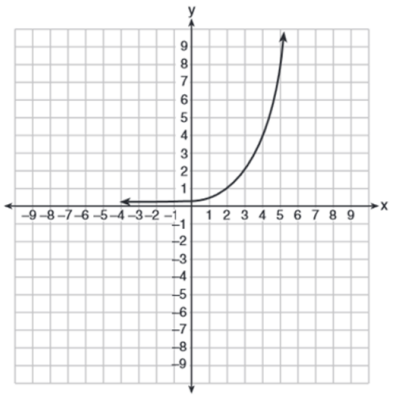
Nov 28-10:37 PM

The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

Nov 28-9:50 AM

Write an exponential equation for the graph shown below.



Explain how you determined the equation.

Nov 28-9:49 AM

Rhonda deposited \$3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

Nov 28-9:47 AM

The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

Dec 1-3:24 PM

Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week.
Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike.
Determine which option(s) will enable him to reach his goal. Justify your answer.

Dec 1-3:29 PM

Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over weeks can be defined by the function $f(t) = (8) \cdot 2^t$. Jessica finds that the growth function over weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

Dec 7-12:03 PM

Unit 7. Polynomials

Dec 7-1:11 PM

Four expressions are shown below.

I $2(2x^2 - 2x - 60)$
II $4(x^2 - x - 30)$
III $4(x + 6)(x - 5)$
IV $4x(x - 1) - 120$

The expression $4x^2 - 4x - 120$ is equivalent to

(1) I and II, only
(2) II and IV, only
(3) I, II, and IV
(4) II, III, and IV

Nov 28-9:32 AM

The expression $3(x^2 - 1) - (x^2 - 7x + 10)$ is equivalent to

(1) $2x^2 - 7x + 7$
(2) $2x^2 + 7x - 13$
(3) $2x^2 - 7x + 9$
(4) $2x^2 + 7x - 11$

Dec 7-12:17 PM

The expression $x^4 - 16$ is equivalent to

(1) $(x^2 + 8)(x^2 - 8)$
(2) $(x^2 - 8)(x^2 - 8)$
(3) $(x^2 + 4)(x^2 - 4)$
(4) $(x^2 - 4)(x^2 - 4)$

Dec 7-12:14 PM

An expression of the fifth degree is written with a leading coefficient of seven and a constant of six. Which expression is correctly written for these conditions?

(1) $6x^5 + x^4 + 7$
(2) $7x^6 - 6x^4 + 5$
(3) $6x^7 - x^5 + 5$
(4) $7x^5 + 2x^2 + 6$

Dec 7-12:14 PM

When factored completely, $x^3 - 13x^2 - 30x$ is

(1) $x(x + 3)(x - 10)$
(2) $x(x - 3)(x - 10)$
(3) $x(x + 2)(x - 15)$
(4) $x(x - 2)(x + 15)$

Dec 7-11:52 AM

When $(2x - 3)^2$ is subtracted from $5x^2$, the result is

(1) $x^2 - 12x - 9$
(2) $x^2 - 12x + 9$
(3) $x^2 + 12x - 9$
(4) $x^2 + 12x + 9$

Dec 7-11:52 AM

The expression $49x^2 - 36$ is equivalent to

(1) $(7x - 6)^2$
(2) $(24.5x - 18)^2$
(3) $(7x - 6)(7x + 6)$
(4) $(24.5x - 18)(24.5x + 18)$

Dec 2-8:02 PM

Which expression is equivalent to $16x^4 - 64$?

(1) $(4x^2 - 8)^2$
(2) $(8x^2 - 32)^2$
(3) $(4x^2 + 8)(4x^2 - 8)$
(4) $(8x^2 + 32)(8x^2 - 32)$

Dec 1-3:16 PM

Which expression is equivalent to $16x^2 - 36$?

(1) $4(2x - 3)(2x - 3)$
(2) $4(2x + 3)(2x - 3)$
(3) $(4x - 6)(4x - 6)$
(4) $(4x + 6)(4x + 6)$

Nov 29-1:36 PM

What is the product of $2x + 3$ and $4x^2 - 5x + 6$?

(1) $8x^3 - 2x^2 + 3x + 18$
(2) $8x^3 - 2x^2 - 3x + 18$
(3) $8x^3 + 2x^2 - 3x + 18$
(4) $8x^3 + 2x^2 + 3x + 18$

Nov 28-10:28 PM

Which expression is equivalent to $36x^2 - 100$?

(1) $4(3x - 5)(3x - 5)$
(2) $4(3x + 5)(3x - 5)$
(3) $2(9x - 25)(9x - 25)$
(4) $2(9x + 25)(9x - 25)$

Nov 28-10:25 PM

Fred is given a rectangular piece of paper. If the length of Fred's piece of paper is represented by $2x - 6$ and the width is represented by $3x - 5$, then the paper has a total area represented by

(1) $5x - 11$
(2) $6x^2 - 28x + 30$
(3) $10x - 22$
(4) $6x^2 - 6x - 11$

Nov 28-9:34 AM

A company produces x units of a product per month, where $C(x)$ represents the total cost and $R(x)$ represents the total revenue for the month. The functions are modeled by $C(x) = 300x + 250$ and $R(x) = -0.5x^2 + 800x - 100$. The profit is the difference between revenue and cost where $P(x) = R(x) - C(x)$. What is the total profit, $P(x)$, for the month?

(1) $P(x) = -0.5x^2 + 500x - 150$
(2) $P(x) = -0.5x^2 + 500x - 350$
(3) $P(x) = -0.5x^2 - 500x + 350$
(4) $P(x) = -0.5x^2 + 500x + 350$

Nov 28-9:35 AM

If $A = 3x^2 + 5x - 6$ and $B = -2x^2 - 6x + 7$, then $A - B$ equals

(1) $-5x^2 - 11x + 13$
(2) $5x^2 + 11x - 13$
(3) $-5x^2 - x + 1$
(4) $5x^2 - x + 1$

Nov 28-9:35 AM

If the area of a rectangle is expressed as $x^4 - 9y^2$, then the product of the length and the width of the rectangle could be expressed as

(1) $(x - 3y)(x + 3y)$
(2) $(x^2 - 3y)(x^2 + 3y)$
(3) $(x^2 - 3y)(x^2 - 3y)$
(4) $(x^4 + y)(x - 9y)$

Nov 28-9:33 AM

When factored completely, the expression $p^4 - 81$ is equivalent to

(1) $(p^2 + 9)(p^2 - 9)$
(2) $(p^2 - 9)(p^2 - 9)$
(3) $(p^2 + 9)(p + 3)(p - 3)$
(4) $(p + 3)(p - 3)(p + 3)(p - 3)$

Nov 28-9:33 AM

Which expression is equivalent to $x^4 - 12x^2 + 36$?

(1) $(x^2 - 6)(x^2 - 6)$
(2) $(x^2 + 6)(x^2 + 6)$
(3) $(6 - x^2)(6 + x^2)$
(4) $(x^2 + 6)(x^2 - 6)$

Nov 28-9:33 AM

Which trinomial is equivalent to $3(x - 2)^2 - 2(x - 1)$?

(1) $3x^2 - 2x - 10$
(2) $3x^2 - 2x - 14$
(3) $3x^2 - 14x + 10$
(4) $3x^2 - 14x + 14$

Nov 28-9:34 AM

Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

Nov 28-9:35 AM

Factor the expression $x^4 + 6x^2 - 7$ completely.

Nov 28-9:33 AM

In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.

Nov 28-9:34 AM

If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

Nov 28-9:34 AM

When multiplying polynomials for a math assignment, Pat found the product to be $-4x + 8x^2 - 2x^3 + 5$. He then had to state the leading coefficient of this polynomial. Pat wrote down -4. Do you agree with Pat's answer? Explain your reasoning.

Nov 28-10:37 PM

Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.

Nov 28-9:35 AM

Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

Dec 1-3:23 PM

Write the expression $5x + 4x^2(2x + 7) - 6x^2 - 9x$ as a polynomial in standard form.

Dec 7-10:15 AM

Unit 8. Quadratic Functions and their Algebra

Dec 7-1:11 PM

Which value of x is a solution to the equation $13 - 36x^2 = -12$?

(1) $\frac{36}{25}$ (3) $-\frac{6}{5}$

(2) $\frac{25}{36}$ (4) $-\frac{5}{6}$

Nov 29-1:45 PM

Sara was asked to solve this word problem: "The product of two consecutive integers is 156. What are the integers?"
What type of equation should she create to solve this problem?

(1) linear (3) exponential

(2) quadratic (4) absolute value

Dec 7-12:28 PM

Which equation and ordered pair represent the correct vertex form and vertex for $j(x) = x^2 - 12x + 7$?

(1) $j(x) = (x - 6)^2 + 43$, (6,43)

(2) $j(x) = (x - 6)^2 + 43$, (−6,43)

(3) $j(x) = (x - 6)^2 - 29$, (6,−29)

(4) $j(x) = (x - 6)^2 - 29$, (−6,−29)

Dec 7-12:23 PM

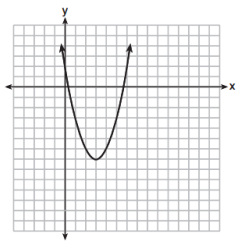
The zeros of the function $f(x) = x^2 - 5x - 6$ are

(1) −1 and 6 (3) 2 and −3

(2) 1 and −6 (4) −2 and 3

Dec 7-12:19 PM

The graph representing a function is shown below.



Which function has a minimum that is *less* than the one shown in the graph?

(1) $y = x^2 - 6x + 7$ (3) $y = x^2 - 2x - 10$

(2) $y = |x + 3| - 6$ (4) $y = |x - 8| + 2$

Dec 7-11:59 AM

Joe has a rectangular patio that measures 10 feet by 12 feet. He wants to increase the area by 50% and plans to increase each dimension by equal lengths, x. Which equation could be used to determine x?

(1) $(10 + x)(12 + x) = 120$
(2) $(10 + x)(12 + x) = 180$
(3) $(15 + x)(18 + x) = 180$
(4) $(15)(18) = 120 + x^2$

Dec 7-11:52 AM

The zeros of the function $f(x) = 2x^2 - 4x - 6$ are

(1) 3 and -1
(2) 3 and 1
(3) -3 and 1
(4) -3 and -1

Dec 7-11:52 AM

Which equation is equivalent to $y - 34 = x(x - 12)$?

(1) $y = (x - 17)(x + 2)$
(2) $y = (x - 17)(x - 2)$
(3) $y = (x - 6)^2 + 2$
(4) $y = (x - 6)^2 - 2$

Dec 7-11:51 AM

In the function $f(x) = (x - 2)^2 + 4$, the minimum value occurs when x is

(1) -2
(2) 2
(3) -4
(4) 4

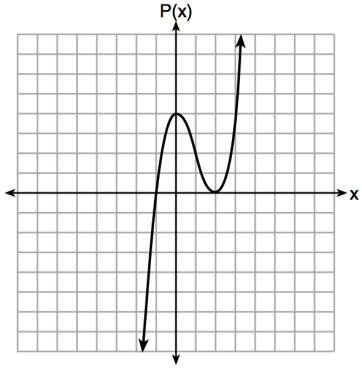
Dec 7-11:48 AM

Abigail's and Gina's ages are consecutive integers. Abigail is younger than Gina and Gina's age is represented by x. If the difference of the square of Gina's age and eight times Abigail's age is 17, which equation could be used to find Gina's age?

(1) $(x + 1)^2 - 8x = 17$
(2) $(x - 1)^2 - 8x = 17$
(3) $x^2 - 8(x + 1) = 17$
(4) $x^2 - 8(x - 1) = 17$

Dec 5-10:53 AM

Wenona sketched the polynomial $P(x)$ as shown on the axes below.



Which equation could represent $P(x)$?

(1) $P(x) = (x + 1)(x - 2)^2$
(2) $P(x) = (x - 1)(x + 2)^2$
(3) $P(x) = (x + 1)(x - 2)$
(4) $P(x) = (x - 1)(x + 2)$

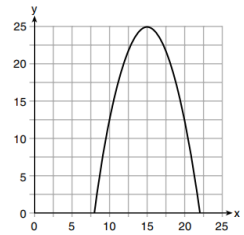
Dec 2-8:03 PM

Morgan throws a ball up into the air. The height of the ball above the ground, in feet, is modeled by the function $h(t) = -16t^2 + 24t$, where t represents the time, in seconds, since the ball was thrown. What is the appropriate domain for this situation?

(1) $0 \le t \le 1.5$
(2) $0 \le t \le 9$
(3) $0 \le h(t) \le 1.5$
(4) $0 \le h(t) \le 9$

Dec 1-3:23 PM

The graph of a quadratic function is shown below.



An equation that represents the function could be

(1) $q(x) = \frac{1}{2}(x + 15)^2 - 25$
(2) $q(x) = -\frac{1}{2}(x + 15)^2 - 25$
(3) $q(x) = \frac{1}{2}(x - 15)^2 + 25$
(4) $q(x) = -\frac{1}{2}(x - 15)^2 + 25$

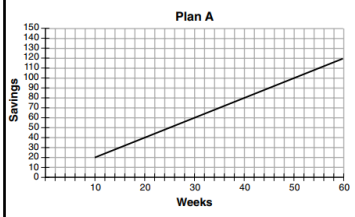
Dec 1-3:20 PM

Which polynomial function has zeros at -3, 0, and 4?

(1) $f(x) = (x + 3)(x^2 + 4)$
(2) $f(x) = (x^2 - 3)(x - 4)$
(3) $f(x) = x(x + 3)(x - 4)$
(4) $f(x) = x(x - 3)(x + 4)$

Dec 1-3:18 PM

Nancy works for a company that offers two types of savings plans. Plan A is represented on the graph below.



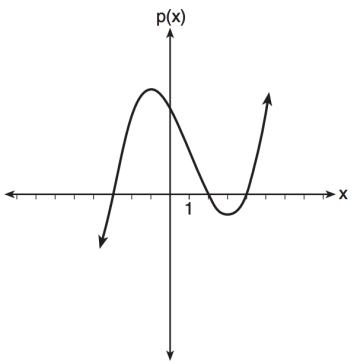
Plan B is represented by the function $f(x) = 0.01 + 0.05x^2$, where x is the number of weeks. Nancy wants to have the highest savings possible after a year. Nancy picks Plan B.

Her decision is

(1) correct, because Plan B is an exponential function and will increase at a faster rate
(2) correct, because Plan B is a quadratic function and will increase at a faster rate
(3) incorrect, because Plan A will have a higher value after 1 year
(4) incorrect, because Plan B is a quadratic function and will increase at a slower rate

Nov 29-1:48 PM

Based on the graph below, which expression is a possible factorization of $p(x)$?



(1) $(x + 3)(x - 2)(x - 4)$
(2) $(x - 3)(x + 2)(x + 4)$
(3) $(x + 3)(x - 5)(x - 2)(x - 4)$
(4) $(x - 3)(x + 5)(x + 2)(x + 4)$

Nov 28-10:34 PM

What is the solution set of the equation $(x - 2)(x - a) = 0$?

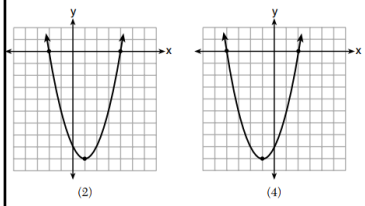
(1) -2 and a
(2) -2 and $-a$
(3) 2 and a
(4) 2 and $-a$

Nov 29-1:36 PM

Which function has zeros of −4 and 2?

$f(x) = x^2 + 7x - 8$ (1)

$g(x) = x^2 - 7x - 8$ (3)

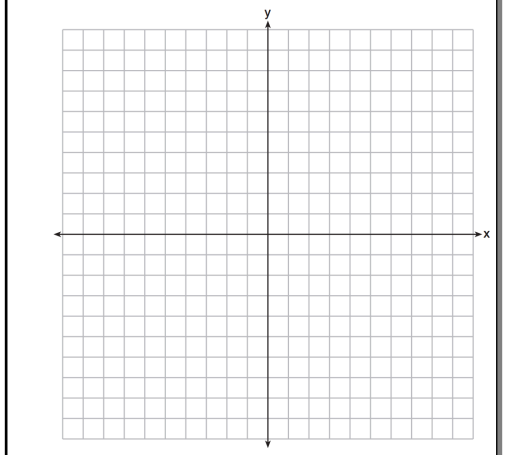


(2)

(4)

Nov 29-1:39 PM

On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



State the equation of the axis of symmetry.

Nov 28-10:15 PM

Let f be the function represented by the graph below.

Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

Determine which function has the larger maximum value. Justify your answer.

Nov 28-9:47 AM

The height of a rocket, at selected times, is shown in the table below.

Time (sec)	0	1	2	3	4	5	6	7
Height (ft)	180	260	308	324	308	260	180	68

Based on these data, which statement is *not* a valid conclusion?

(1) The rocket was launched from a height of 180 feet.

(2) The maximum height of the rocket occurred 3 seconds after launch.

(3) The rocket was in the air approximately 6 seconds before hitting the ground.

(4) The rocket was above 300 feet for approximately 2 seconds.

Nov 28-10:29 PM

Sara was asked to solve this word problem: "The product of two consecutive integers is 156. What are the integers?"
What type of equation should she create to solve this problem?

(1) linear

(2) quadratic

(3) exponential

(4) absolute value

Nov 28-10:13 PM

The zeros of the function $f(x) = (x + 2)^2 - 25$ are

(1) −2 and 5

(2) −3 and 7

(3) −5 and 2

(4) −7 and 3

Nov 28-9:47 AM

The function $f(x) = 3x^2 + 12x + 11$ can be written in vertex form as

(1) $f(x) = (3x + 6)^2 - 25$ (3) $f(x) = 3(x + 2)^2 - 1$

(2) $f(x) = 3(x + 6)^2 - 25$ (4) $f(x) = 3(x + 2)^2 + 7$

Nov 28-10:33 PM

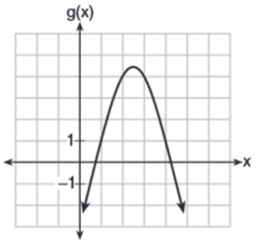
Which quadratic function has the largest maximum?

$h(x) = (3 - x)(2 + x)$ $k(x) = -5x^2 - 12x + 4$

(1) (3)

x	f(x)
−1	−3
0	5
1	9
2	9
3	5
4	−3

(2)



(4)

Nov 28-9:46 AM

Given the following quadratic functions:

$$g(x) = -x^2 - x + 6$$

and

x	−3	−2	−1	0	1	2	3	4	5
n(x)	−7	0	5	8	9	8	5	0	−7

Which statement about these functions is true?

(1) Over the interval $-1 \le x \le 1$, the average rate of change for $n(x)$ is less than that for $g(x)$.

(2) The y-intercept of $g(x)$ is greater than the y-intercept for $n(x)$.

(3) The function $g(x)$ has a greater maximum value than $n(x)$.

(4) The sum of the roots of $n(x) = 0$ is greater than the sum of the roots of $g(x) = 0$.

Nov 28-9:46 AM

The function $h(t) = -16t^2 + 144$ represents the height, $h(t)$, in feet, of an object from the ground at t seconds after it is dropped. A realistic domain for this function is

(1) $-3 \le t \le 3$ (3) $0 \le h(t) \le 144$

(2) $0 \le t \le 3$ (4) all real numbers

Nov 28-9:45 AM

If $4x^2 - 100 = 0$, the roots of the equation are

(1) -25 and 25 (3) -5 and 5

(2) -25, only (4) -5, only

Nov 28-9:40 AM

Which equation has the same solutions as $x^2 + 6x - 7 = 0$?

(1) $(x + 3)^2 = 2$ (3) $(x - 3)^2 = 16$

(2) $(x - 3)^2 = 2$ (4) $(x + 3)^2 = 16$

Nov 28-9:39 AM

A student is asked to solve the equation $4(3x - 1)^2 - 17 = 83$. The student's solution to the problem starts as

$$4(3x - 1)^2 = 100$$
$$(3x - 1)^2 = 25$$

A correct next step in the solution of the problem is

(1) $3x - 1 = \pm 5$
(2) $3x - 1 = \pm 25$
(3) $9x^2 - 1 = 25$
(4) $9x^2 - 6x + 1 = 5$

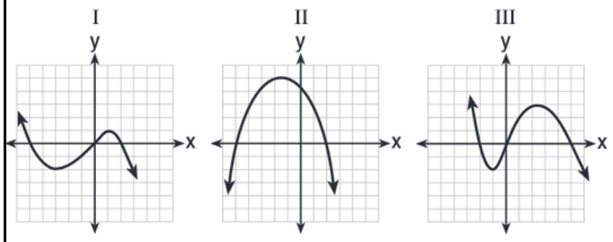
Nov 28-9:38 AM

If Lylah completes the square for $f(x) = x^2 - 12x + 7$ in order to find the minimum, she must write $f(x)$ in the general form $f(x) = (x - a)^2 + b$. What is the value of a for $f(x)$?

(1) 6
(2) -6
(3) 12
(4) -12

Nov 28-9:33 AM

A polynomial function contains the factors x, $x - 2$, and $x + 5$. Which graph(s) below could represent the graph of this function?



(1) I, only
(2) II, only
(3) I and III
(4) I, II, and III

Nov 28-9:35 AM

The zeros of the function $f(x) = 3x^2 - 3x - 6$ are

(1) -1 and -2
(2) 1 and -2
(3) 1 and 2
(4) -1 and 2

Nov 28-9:34 AM

What are the zeros of the function $f(x) = x^2 - 13x - 30$?

(1) -10 and 3
(2) 10 and -3
(3) -15 and 2
(4) 15 and -2

Nov 28-9:34 AM

When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

(1) $x^2 + 5x + 7 = 0$
(2) $x^2 + 5x + 3 = 0$
(3) $x^2 - 5x + 7 = 0$
(4) $x^2 - 5x + 3 = 0$

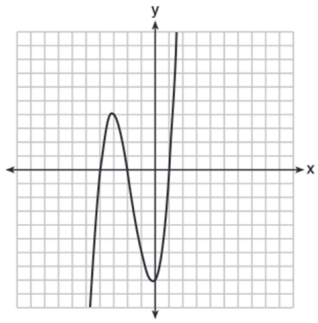
Nov 28-9:39 AM

Which equation has the same solutions as $2x^2 + x - 3 = 0$?

(1) $(2x - 1)(x + 3) = 0$
(3) $(2x - 3)(x + 1) = 0$
(2) $(2x + 1)(x - 3) = 0$
(4) $(2x + 3)(x - 1) = 0$

Nov 28-9:34 AM

The graph of $f(x)$ is shown below.



Which function could represent the graph of $f(x)$?

(1) $f(x) = (x + 2)(x^2 + 3x - 4)$
(2) $f(x) = (x - 2)(x^2 + 3x - 4)$
(3) $f(x) = (x + 2)(x^2 + 3x + 4)$
(4) $f(x) = (x - 2)(x^2 + 3x + 4)$

Nov 28-9:35 AM

Keith determines the zeros of the function $f(x)$ to be -6 and 5. What could be Keith's function?

(1) $f(x) = (x + 5)(x + 6)$
(3) $f(x) = (x - 5)(x + 6)$
(2) $f(x) = (x + 5)(x - 6)$
(4) $f(x) = (x - 5)(x - 6)$

Nov 28-9:34 AM

What are the solutions to the equation $3x^2 + 10x = 8$?

(1) $\frac{2}{3}$ and -4
(3) $\frac{4}{3}$ and -2
(2) $-\frac{2}{3}$ and 4
(4) $-\frac{4}{3}$ and 2

Nov 28-10:32 PM

Sam and Jeremy have ages that are consecutive odd integers. The product of their ages is 783. Which equation could be used to find Jeremy's age, j, if he is the younger man?

(1) $j^2 + 2 = 783$
(3) $j^2 + 2j = 783$
(2) $j^2 - 2 = 783$
(4) $j^2 - 2j = 783$

Nov 28-9:37 AM

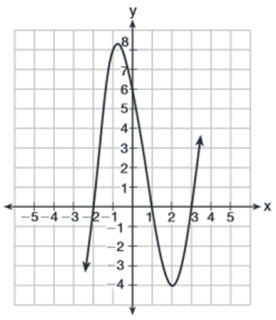
Which point is *not* on the graph represented by $y = x^2 + 3x - 6$?

(1) $(-6,12)$
(3) $(2,4)$
(2) $(-4,-2)$
(4) $(3,-6)$

Nov 28-9:43 AM

Which equation(s) represent the graph below?

I $y = (x + 2)(x^2 - 4x - 12)$
II $y = (x - 3)(x^2 + x - 2)$
III $y = (x - 1)(x^2 - 5x - 6)$



(1) I, only
(2) II, only
(3) I and II
(4) II and III

Nov 28-9:35 AM

a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

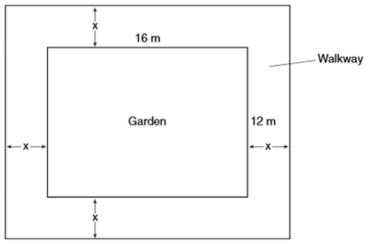
b) Rewrite $f(x)$ in vertex form by completing the square.

Nov 28-9:46 AM

Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

Nov 28-10:15 PM

A rectangular garden measuring 12 meters by 16 meters is to have a walkway installed around it with a width of x meters, as shown in the diagram below. Together, the walkway and the garden have an area of 396 square meters.



Write an equation that can be used to find x, the width of the walkway.

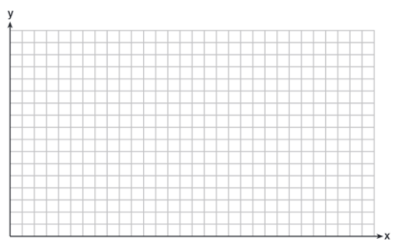
Describe how your equation models the situation.

Determine and state the width of the walkway, in meters.

Nov 28-9:38 AM

A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.



Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

Nov 28-9:45 AM

A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

Nov 28-9:45 AM

Solve the equation $4x^2 - 12x = 7$ algebraically for x.

Nov 28-9:40 AM

A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

Nov 28-9:36 AM

A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

Explain how your equation or inequality models the situation.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

Nov 28-9:35 AM

How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

Nov 28-9:39 AM

A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

Nov 28-9:38 AM

New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

Nov 28-9:37 AM

A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

Explain how the value of c is determined.

Nov 28-9:40 AM

The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

Determine, algebraically, how many seconds it will take for the object to reach the ground.

Nov 28-10:18 PM

Write an equation that defines $m(x)$ as a trinomial where $m(x) = (3x - 1)(3 - x) + 4x^2 + 19$.

Solve for x when $m(x) = 0$.

Nov 28-9:40 AM

John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

Nov 28-9:42 AM

Janice is asked to solve $0 = 64x^2 + 16x - 3$. She begins the problem by writing the following steps:

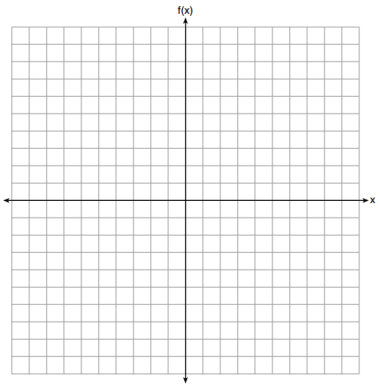
Line 1 $0 = 64x^2 + 16x - 3$
Line 2 $0 = B^2 + 2B - 3$
Line 3 $0 = (B + 3)(B - 1)$

Use Janice's procedure to solve the equation for x.

Explain the method Janice used to solve the quadratic equation.

Nov 28-10:41 PM

Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

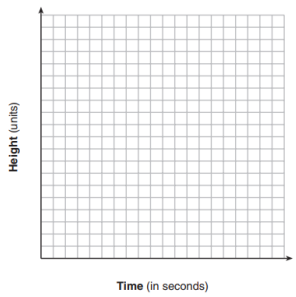
Dec 1-3:24 PM

The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

Explain what the zeros represent on the graph of $r(x)$.

Dec 1-3:26 PM

Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



State the coordinates of the vertex and explain its meaning in the context of the problem.

Nov 29-1:54 PM

An Air Force pilot is flying at a cruising altitude of 9000 feet and is forced to eject from her aircraft. The function $h(t) = -16t^2 + 128t + 9000$ models the height, in feet, of the pilot above the ground, where t is the time, in seconds, after she is ejected from the aircraft.

Determine and state the vertex of $h(t)$. Explain what the second coordinate of the vertex represents in the context of the problem.

After the pilot was ejected, what is the maximum number of feet she was above the aircraft's cruising altitude? Justify your answer.

Dec 7-10:19 AM

Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

Dec 7-12:01 PM

Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

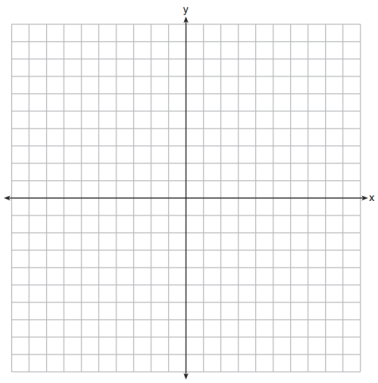
Dec 7-12:04 PM

A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.

Dec 7-12:06 PM

On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



State the equation of the axis of symmetry.

Dec 7-12:31 PM

Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

Dec 7-12:32 PM

The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

Determine, algebraically, how many seconds it will take for the object to reach the ground.

Dec 7-12:37 PM

Unit 9. Roots and Irrational Numbers

Dec 7-1:12 PM

For which value of P and W is $P + W$ a rational number?

(1) $P = \frac{1}{\sqrt{3}}$ and $W = \frac{1}{\sqrt{6}}$

(2) $P = \frac{1}{\sqrt{4}}$ and $W = \frac{1}{\sqrt{9}}$

(3) $P = \frac{1}{\sqrt{6}}$ and $W = \frac{1}{\sqrt{10}}$

(4) $P = \frac{1}{\sqrt{25}}$ and $W = \frac{1}{\sqrt{2}}$

Nov 28-9:31 AM

What is the solution of the equation $2(x + 2)^2 - 4 = 28$?

(1) 6, only
(2) 2, only
(3) 2 and -6
(4) 6 and -2

Dec 7-12:25 PM

When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?

(1) $(x - 4)^2 = 9$
(2) $(x - 4)^2 = 23$
(3) $(x - 8)^2 = 9$
(4) $(x - 8)^2 = 23$

Dec 7-11:53 AM

Given the following expressions:

I. $-\frac{5}{8} + \frac{3}{5}$
II. $\frac{1}{2} + \sqrt{2}$
III. $(\sqrt{5}) \cdot (\sqrt{5})$
IV. $3 \cdot (\sqrt{49})$

Which expression(s) result in an irrational number?

(1) II, only
(2) III, only
(3) I, III, IV
(4) II, III, IV

Dec 7-11:49 AM

A teacher wrote the following set of numbers on the board:

$a = \sqrt{20}$ $b = 2.5$ $c = \sqrt{225}$

Explain why $a + b$ is irrational, but $b + c$ is rational.

Dec 5-10:56 AM

What are the solutions to the equation $x^2 - 8x = 10$?

(1) $4 \pm \sqrt{10}$
(2) $4 \pm \sqrt{26}$
(3) $-4 \pm \sqrt{10}$
(4) $-4 \pm \sqrt{26}$

Dec 1-3:22 PM

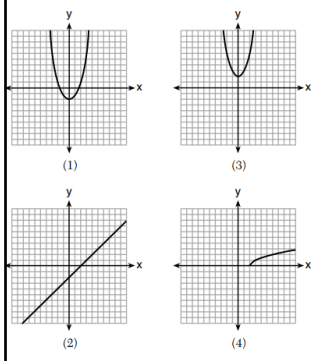
Which statement is true about the quadratic functions $g(x)$, shown in the table below, and $f(x) = (x - 3)^2 + 2$?

x	g(x)
0	4
1	−1
2	−4
3	−5
4	−4
5	−1
6	4

(1) They have the same vertex.
(2) They have the same zeros.
(3) They have the same axis of symmetry.
(4) They intersect at two points.

Dec 1-3:20 PM

Which graph represents $y = \sqrt{x - 2}$?



Dec 1-3:15 PM

What are the solutions to the equation $x^2 - 8x = 24$?

(1) $x = 4 \pm 2\sqrt{10}$
(2) $x = -4 \pm 2\sqrt{10}$
(3) $x = 4 \pm 2\sqrt{2}$
(4) $x = -4 \pm 2\sqrt{2}$

Nov 28-9:39 AM

Which equation has the same solution as $x^2 - 6x - 12 = 0$?

(1) $(x + 3)^2 = 21$
(2) $(x - 3)^2 = 21$
(3) $(x + 3)^2 = 3$
(4) $(x - 3)^2 = 3$

Nov 28-9:40 AM

What are the roots of the equation $x^2 + 4x - 16 = 0$?

(1) $2 \pm 2\sqrt{5}$
(2) $-2 \pm 2\sqrt{5}$
(3) $2 \pm 4\sqrt{5}$
(4) $-2 \pm 4\sqrt{5}$

Nov 28-9:40 AM

What is the solution of the equation $2(x + 2)^2 - 4 = 28$?

(1) 6, only
(2) 2, only
(3) 2 and -6
(4) 6 and -2

Nov 28-10:10 PM

Which statement is *not* always true?

(1) The product of two irrational numbers is irrational.
(2) The product of two rational numbers is rational.
(3) The sum of two rational numbers is rational.
(4) The sum of a rational number and an irrational number is irrational.

Nov 28-9:31 AM

Given: $L = \sqrt{2}$
$M = 3\sqrt{3}$
$N = \sqrt{16}$
$P = \sqrt{9}$

Which expression results in a rational number?

(1) $L + M$
(2) $M + N$
(3) $N + P$
(4) $P + L$

Nov 28-9:32 AM

The solution of the equation $(x + 3)^2 = 7$ is

(1) $3 \pm \sqrt{7}$ (3) $-3 \pm \sqrt{7}$

(2) $7 \pm \sqrt{3}$ (4) $-7 \pm \sqrt{3}$

Nov 28-9:39 AM

The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?

1) $(x - 3)^2 = 6$ (3) $(x - 3)^2 = 3$

2) $(x - 3)^2 = -6$ (4) $(x - 3)^2 = -3$

Nov 29-1:48 PM

Which statement is *not* always true?

(1) The sum of two rational numbers is rational.

(2) The product of two irrational numbers is rational.

(3) The sum of a rational number and an irrational number is irrational.

(4) The product of a nonzero rational number and an irrational number is irrational.

Nov 28-9:31 AM

Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

Nov 29-1:51 PM

Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

Nov 28-10:14 PM

Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

Nov 28-10:37 PM

Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

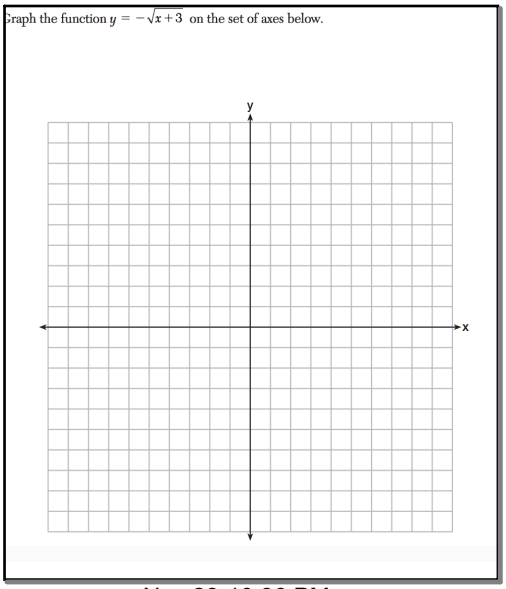
State whether Patrick is correct or incorrect. Justify your reasoning.

Nov 28-9:31 AM

Find the zeros of $f(x) = (x - 3)^2 - 49$, algebraically.

Nov 28-10:38 PM

Graph the function $y = -\sqrt{x+3}$ on the set of axes below.



Nov 28-10:36 PM

State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

Dec 1-3:24 PM

Given:

$g(x) = 2x^2 + 3x + 10$
$k(x) = 2x + 16$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

Explain why you chose the method you used to solve this quadratic equation.

Dec 1-3:28 PM

Solve the equation $x^2 - 6x = 15$ by completing the square.

Dec 7-10:15 AM

Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

Dec 7-12:04 PM

Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

Dec 7-12:30 PM

Unit 10. Statistics

Dec 7-1:12 PM

The table below shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true?

(1) Both will increase.
(2) Only the median will increase.
(3) Only the mean will increase.
(4) Neither will change.

Nov 28-9:51 AM

The dot plot shown below represents the number of pets owned by students in a class.

Which statement about the data is *not* true?

(1) The median is 3.
(2) The interquartile range is 2.
(3) The mean is 3.
(4) The data contain no outliers.

Dec 7-12:25 PM

A public opinion poll was taken to explore the relationship between age and support for a candidate in an election. The results of the poll are summarized in the table below.

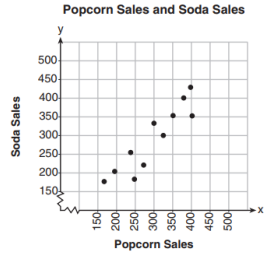
Age	For	Against	No Opinion
21–40	30	12	8
41–60	20	40	15
Over 60	25	35	15

What percent of the 21–40 age group was for the candidate?

(1) 15
(2) 25
(3) 40
(4) 60

Dec 7-12:20 PM

The scatterplot below compares the number of bags of popcorn and the number of sodas sold at each performance of the circus over one week.

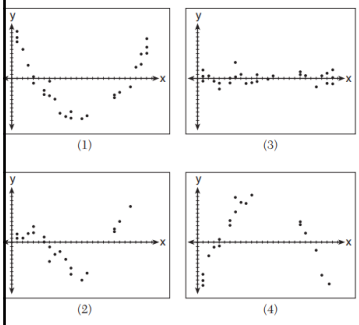


Which conclusion can be drawn from the scatterplot?

1) There is a negative correlation between popcorn sales and soda sales.
2) There is a positive correlation between popcorn sales and soda sales.
3) There is no correlation between popcorn sales and soda sales.
4) Buying popcorn causes people to buy soda.

Dec 7-12:15 PM

After performing analyses on a set of data, Jackie examined the scatter plot of the residual values for each analysis. Which scatter plot indicates the best linear fit for the data?



Dec 7-12:00 PM

The results of a linear regression are shown below.

$y = ax + b$
$a = -1.15785$
$b = 139.3171772$
$r = -0.896557832$
$r^2 = 0.8038159461$

Which phrase best describes the relationship between x and y?

(1) strong negative correlation
(2) strong positive correlation
(3) weak negative correlation
(4) weak positive correlation

Dec 5-10:45 AM

Which situation does *not* describe a causal relationship?

(1) The higher the volume on a radio, the louder the sound will be.
(2) The faster a student types a research paper, the more pages the research paper will have.
(3) The shorter the time a car remains running, the less gasoline it will use.
(4) The slower the pace of a runner, the longer it will take the runner to finish the race.

Dec 2-8:04 PM

The heights, in inches, of 12 students are listed below.

61, 67, 72, 62, 65, 59, 60, 79, 60, 61, 64, 63

Which statement best describes the spread of these data?

(1) The set of data is evenly spread.
(2) The median of the data is 59.5.
(3) The set of data is skewed because 59 is the only value below 60.
(4) 79 is an outlier, which would affect the standard deviation of these data.

Dec 1-3:19 PM

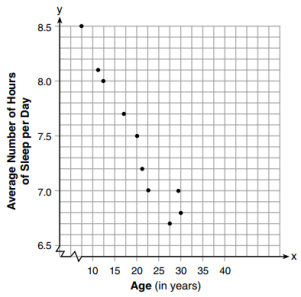
Bella recorded data and used her graphing calculator to find the equation for the line of best fit. She then used the correlation coefficient to determine the strength of the linear fit.

Which correlation coefficient represents the strongest linear relationship?

(1) 0.9
(2) 0.5
(3) −0.3
(4) −0.8

Dec 1-3:19 PM

A student plotted the data from a sleep study as shown in the graph below.



The student used the equation of the line $y = -0.09x + 9.24$ to model the data. What does the rate of change represent in terms of these data?

(1) The average number of hours of sleep per day increases 0.09 hour per year of age.
(2) The average number of hours of sleep per day decreases 0.09 hour per year of age.
(3) The average number of hours of sleep per day increases 9.24 hours per year of age.
(4) The average number of hours of sleep per day decreases 9.24 hours per year of age.

Dec 1-3:15 PM

A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

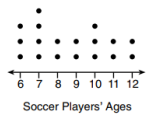
	Hip-Hop	Alternative	Classic Rock
Middle School	28	18	4
High School	22	22	6
College	16	20	14

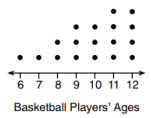
What percentage of college students prefer classic rock?

(1) 14%
(2) 28%
(3) 33%
(4) 58%

Nov 29-1:38 PM

Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.





Which statement about the given data sets is correct?

(1) The data for soccer players are skewed right.
(2) The data for soccer players have less spread than the data for basketball players.
(3) The data for basketball players have the same median as the data for soccer players.
(4) The data for basketball players have a greater mean than the data for soccer players.

Nov 29-1:46 PM

What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

(1) positive correlation, but not causal
(2) positive correlation, and causal
(3) negative correlation, but not causal
(4) negative correlation, and causal

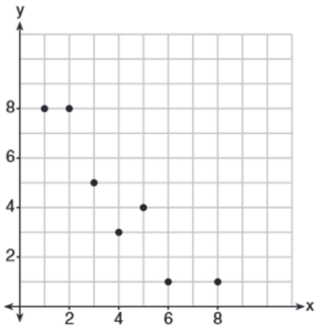
Nov 29-1:44 PM

Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of −0.524. Which statement best summarizes this result?

(1) There is a strong positive correlation between the variables.
(2) There is a strong negative correlation between the variables.
(3) There is a moderate positive correlation between the variables.
(4) There is a moderate negative correlation between the variables.

Nov 29-1:37 PM

What is the correlation coefficient of the linear fit of the data shown below, to the *nearest hundredth*?



(1) 1.00
(2) 0.93
(3) −0.93
(4) −1.00

Nov 28-9:52 AM

Which statistic can *not* be determined from a box plot representing the scores on a math test in Mrs. DeRidder's algebra class?

(1) the lowest score

(2) the median score

(3) the highest score

(4) the score that occurs most frequently

Nov 28-10:23 PM

The table below shows 6 students' overall averages and their averages in their math class.

Overall Student Average	92	98	84	80	75	82
Math Class Average	91	95	85	85	75	78

If a linear model is applied to these data, which statement best describes the correlation coefficient?

(1) It is close to -1.

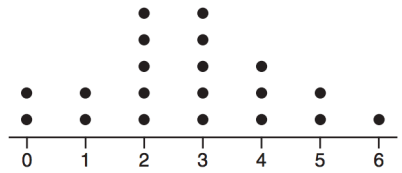
(2) It is close to 1.

(3) It is close to 0.

(4) It is close to 0.5.

Nov 28-10:24 PM

The dot plot shown below represents the number of pets owned by students in a class.



Which statement about the data is *not* true?

(1) The median is 3.

(2) The interquartile range is 2.

(3) The mean is 3.

(4) The data contain no outliers.

Nov 28-10:11 PM

The table below shows the number of grams of carbohydrates, x, and the number of Calories, y, of six different foods.

Carbohydrates (x)	Calories (y)
8	120
9.5	138
10	147
6	88
7	108
4	62

Which equation best represents the line of best fit for this set of data?

(1) $y = 15x$

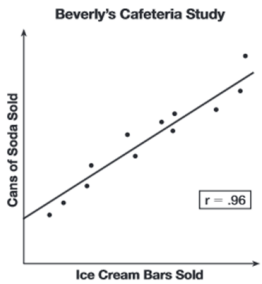
(2) $y = 0.07x$

(3) $y = 0.1x - 0.4$

(4) $y = 14.1x + 5.8$

Nov 28-9:52 AM

Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram below.



Given this information, which statement(s) can correctly be concluded?

I. Eating more ice cream causes a person to become thirsty.

II. Drinking more soda causes a person to become hungry.

III. There is a strong correlation between ice cream sales and soda sales.

(1) I, only

(2) III, only

(3) I and III

(4) II and III

Nov 28-9:51 AM

Christopher looked at his quiz scores shown below for the first and second semester of his Algebra class.

Semester 1: 78, 91, 88, 83, 94

Semester 2: 91, 96, 80, 77, 88, 85, 92

Which statement about Christopher's performance is correct?

(1) The interquartile range for semester 1 is greater than the interquartile range for semester 2.

(2) The median score for semester 1 is greater than the median score for semester 2.

(3) The mean score for semester 2 is greater than the mean score for semester 1.

(4) The third quartile for semester 2 is greater than the third quartile for semester 1.

Nov 28-9:51 AM

The two sets of data below represent the number of runs scored by two different youth baseball teams over the course of a season.

Team A: 4, 8, 5, 12, 3, 9, 5, 2
Team B: 5, 9, 11, 4, 6, 11, 2, 7

Which set of statements about the mean and standard deviation is true?

(1) mean A < mean B
standard deviation A > standard deviation B

(2) mean A > mean B
standard deviation A < standard deviation B

(3) mean A < mean B
standard deviation A < standard deviation B

(4) mean A > mean B
standard deviation A > standard deviation B

Nov 28-9:51 AM

The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.

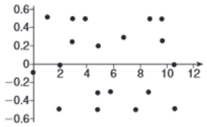
Median Diameter of Grains of Sand, in Millimeters (x)	0.17	0.19	0.22	0.235	0.235	0.3	0.35	0.42	0.85
Slope of Beach, in Degrees (y)	0.63	0.7	0.82	0.88	1.15	1.5	4.4	7.3	11.3

Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth*.

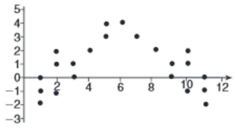
Using this equation, predict the slope of a beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

Nov 28-10:39 PM

The residual plots from two different sets of bivariate data are graphed below.



Graph A



Graph B

Explain, using evidence from graph A and graph B, which graph indicates that the model for the data is a good fit.

Nov 28-9:51 AM

The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

Nov 28-9:52 AM

A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

b) Explain what the correlation coefficient suggests in the context of this problem.

Nov 28-9:52 AM

Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

Number of Hours, x	1	2	3	4	5	6	7	8	9	10
Number of Bacteria, $B(x)$	220	280	350	440	550	690	860	1070	1340	1680

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

Nov 28-9:51 AM

The table below shows the attendance at a museum in select years from 2007 to 2013.

Attendance at Museum

Year	2007	2008	2009	2011	2013
Attendance (millions)	8.3	8.5	8.5	8.8	9.3

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and y is used to represent the attendance. Round all values to the *nearest hundredth*.

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

Nov 28-9:52 AM

A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop			
Don't Like Pop			
Total			

Dec 1-3:25 PM

The heights, in feet, of former New York Knicks basketball players are listed below.

6.4	6.9	6.3	6.2	6.3	6.0	6.1	6.3	6.8	6.2
6.5	7.1	6.4	6.3	6.5	6.5	6.4	7.0	6.4	6.3
6.2	6.3	7.0	6.4	6.5	6.5	6.5	6.0	6.2	

Using the heights given, complete the frequency table below.

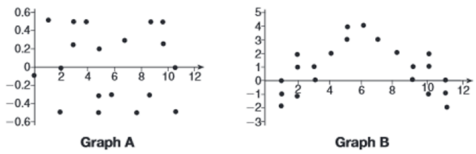
Interval	Frequency
6.0 – 6.1	
6.2 – 6.3	
6.4 – 6.5	
6.6 – 6.7	
6.8 – 6.9	
7.0 – 7.1	

Based on the frequency table created, draw and label a frequency histogram on the grid below.

Determine and state which interval contains the upper quartile. Justify your response.

Dec 7-10:17 AM

The residual plots from two different sets of bivariate data are graphed below.



Graph A Graph B

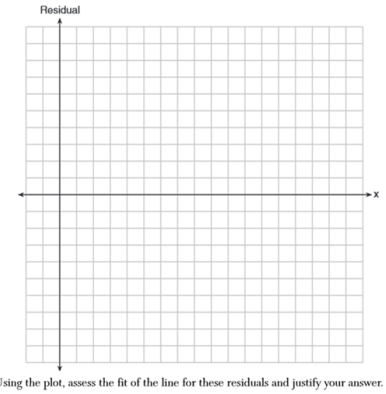
Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Dec 7-10:30 AM

The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	−1	−2	−3	−2	−1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

Dec 7-10:31 AM

A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

Dec 7-12:03 PM

Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

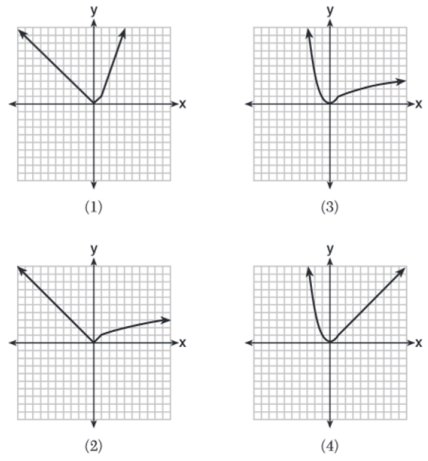
State the correlation coefficient, r, of the data to the *nearest hundredth*. Does r indicate a strong linear relationship between the variables? Explain your reasoning.

Dec 7-12:05 PM

Unit 11. A Final Look at Functions

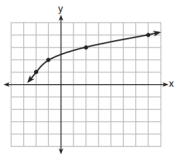
Dec 7-1:12 PM

Which graph represents $f(x) = \begin{cases} |x| & x < 1 \\ \sqrt{x} & x \geq 1 \end{cases}$?

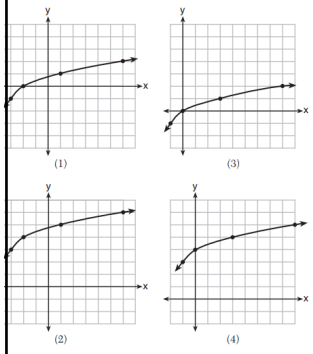


Nov 28-9:46 AM

The graph of $y = f(x)$ is shown below.



What is the graph of $y = f(x + 1) - 2$?



Dec 7-11:57 AM

In the functions $f(x) = kx^2$ and $g(x) = |kx|$, k is a positive integer.

If k is replaced by $\frac{1}{2}$, which statement about these new functions is true?

(1) The graphs of both $f(x)$ and $g(x)$ become wider.

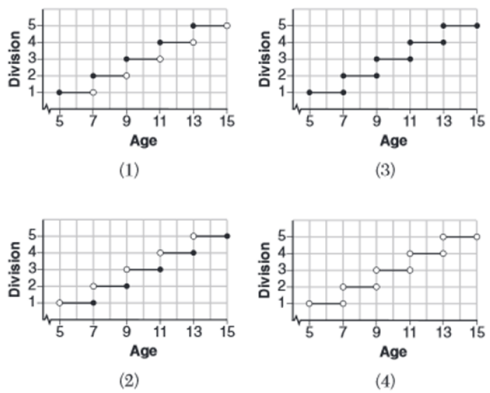
(2) The graph of $f(x)$ becomes narrower and the graph of $g(x)$ shifts left.

(3) The graphs of both $f(x)$ and $g(x)$ shift vertically.

(4) The graph of $f(x)$ shifts left and the graph of $g(x)$ becomes wider.

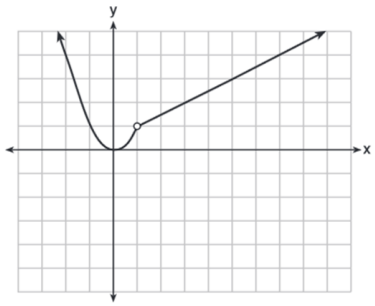
Dec 2-8:03 PM

Morgan can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?



Nov 28-9:46 AM

A function is graphed on the set of axes below.



Which function is related to the graph?

(1) $f(x) = \begin{cases} x^2, & x < 1 \\ x - 2, & x > 1 \end{cases}$

(2) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{1}{2}x + \frac{1}{2}, & x > 1 \end{cases}$

(3) $f(x) = \begin{cases} x^2, & x < 1 \\ 2x - 7, & x > 1 \end{cases}$

(4) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{3}{2}x - \frac{9}{2}, & x > 1 \end{cases}$

Nov 28-9:47 AM

When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$

1) opens upward and is wider
2) opens upward and is narrower
3) opens downward and is wider
4) opens downward and is narrower

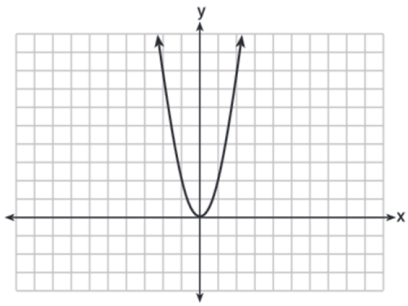
Nov 29-1:45 PM

Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units

(1) right
(2) up
(3) left
(4) down

Nov 28-9:48 AM

The graph of the equation $y = ax^2$ is shown below.



If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

(1) wider and opens downward
(2) wider and opens upward
(3) narrower and opens downward
(4) narrower and opens upward

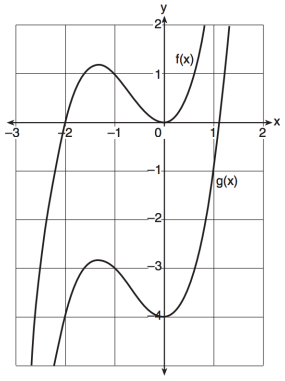
Nov 28-9:48 AM

How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?

(1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
(2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
(3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
(4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

Nov 28-9:48 AM

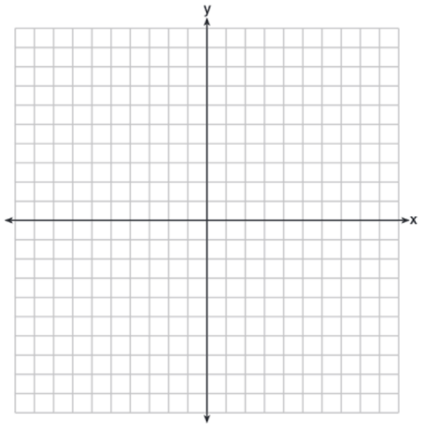
In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.

Nov 28-10:17 PM

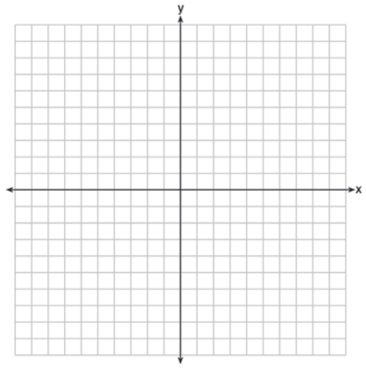
Graph the function $y = |x - 3|$ on the set of axes below.



Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

Nov 28-9:48 AM

On the axes below, graph $f(x) = |3x|$.



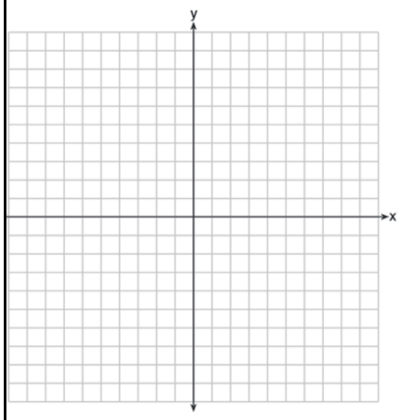
If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

Nov 28-9:48 AM

The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2,-1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$. Explain how you arrived at your answer.

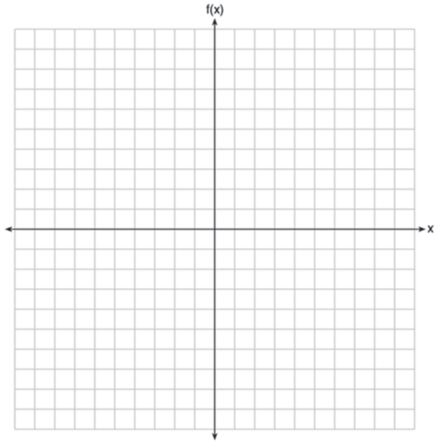
[The use of the set of axes below is optional.]



Nov 28-9:48 AM

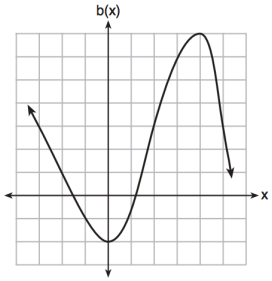
Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \le x < 1 \\ 4, & 1 \le x \le 8 \end{cases}$$



Nov 28-9:46 AM

Richard is asked to transform the graph of $b(x)$ below.



The graph of $b(x)$ is transformed using the equation $h(x) = b(x - 2) - 3$. Describe how the graph of $b(x)$ changed to form the graph of $h(x)$.

Nov 28-10:36 PM

Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

$h(x) = |x| - a$

Dec 1-3:26 PM

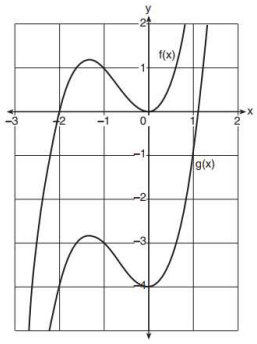
Loretta and her family are going on vacation. Their destination is 610 miles from their home. Loretta is going to share some of the driving with her dad. Her average speed while driving is 55 mph and her dad's average speed while driving is 65 mph.

The plan is for Loretta to drive for the first 4 hours of the trip and her dad to drive for the remainder of the trip. Determine the number of hours it will take her family to reach their destination.

After Loretta has been driving for 2 hours, she gets tired and asks her dad to take over. Determine, to the *nearest tenth of an hour*, how much time the family will save by having Loretta's dad drive for the remainder of the trip.

Dec 7-10:16 AM

In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.

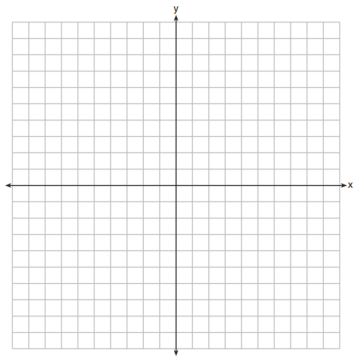
Dec 7-12:36 PM

On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

Dec 7-12:40 PM