



- Online Homework
- Hints and Help
- Extra Practice

1. Is the given equation linear? Select Yes or No.

- A. $-\frac{3}{4}x - \frac{1}{2}y = 2$ Yes No
- B. $y = x^2 - 5$ Yes No
- C. $-\frac{2}{x} = y + 12$ Yes No

2. Consider the equation $2x - \frac{3}{5}y = -6$.

Determine if the given statement is True or False.

- A. The y-intercept is 10. True False
- B. It is equivalent to $x = \frac{3}{10}y - 3$. True False
- C. It is equivalent to $y = \frac{10}{3}x + 10$. True False

3. A line is represented by the equation $y - 5 = 6\left(x + \frac{1}{2}\right)$.

Does the given statement describe the line?

- A. The slope of the line is -6 . Yes No
- B. $\left(-\frac{1}{2}, 5\right)$ is a point on the line. Yes No
- C. The y-intercept of the line is 3. Yes No

4. Does the given statement describe a step in the transformation of the graph of $f(x) = x$ that would result in the graph of $g(x) = -\frac{1}{3}x - 4$?

- A. The parent function is reflected across the y-axis. Yes No
- B. The parent function is translated 4 units down. Yes No
- C. The parent function becomes more steep. Yes No

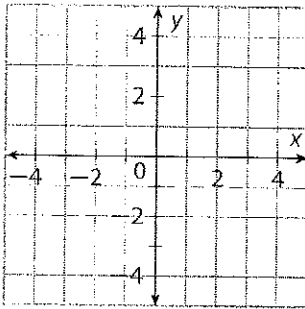
5. Consider the graph of the inequality $2y - 10 \leq -\frac{2}{4}x$.

- A. The boundary line is dashed. Yes No
- B. The boundary line is $y = -\frac{1}{2}x + 5$. Yes No
- C. The half-plane below the boundary line is shaded. Yes No

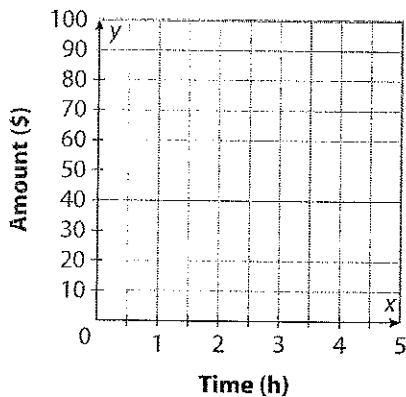
6. Leia and Thaddeus are reading the same 225 page book. Leia starts reading the book and plans to read 25 pages a day. Thaddeus has already read 45 pages and is reading 20 pages a day. Determine if each statement is True or False.

- A. Leia will finish the book in 9 days. True False
- B. $f(x) = 20x$ represents the number of pages Thaddeus has read after x days. True False
- C. They will both finish the book in 9 days. True False

7. Write $5x = -2y + 6$ in slope-intercept form, and graph the line. Explain how you graphed the line.



8. Donnie and Tania are math tutors. The amount Donnie charges for a session h hours long is represented by the function $D(h) = 40h + 10$. Tania charges a flat fee of \$30 plus \$15 an hour. Write a function, $T(h)$, that represents the amount in dollars that Tania charges for h hours of tutoring. Graph both functions on the same coordinate grid, and label each line. Compare the slopes and y -intercepts of the graphs.



Performance Tasks

- ★ 9. A bicycle computer or cyclometer uses a magnetic counter that records each wheel rotation to calculate the bike's total distance traveled. To set up the computer, you select a calibration constant for the bike's wheel size. The computer multiplies this constant times the number of tire rotations to find the total distance in miles. Write a function for the distance d in miles if the calibration number is 0.00125. If the function is incorrect and your tire is actually slightly smaller, how should the function change?

- ★★10. A marina rents party boats for large social gatherings. They charge the following amounts for a 2-hour rental.

Number of People	10	20	35	50
Cost	\$165	\$192.50	\$233.75	\$275

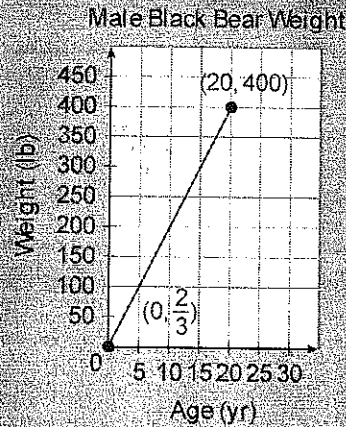
- A. Write an equation that represents the data. Include a definition of your variables.
- B. What are the intercepts of the graph of your equation? What is the slope? What do they mean in this context?
- C. Use your equation to predict the cost of providing a party boat for 75 people.
- D. The marina actually charges \$460 for 75 people. What might be a reason for the difference?
- ★★★11. High demand cars that are also in low supply tend to retain their value better than other cars. The data in the table are for a car that won a resale value award.

Year	1	3	5
Value (%)	84	64	44

- A. Write a function to represent the car's value over time, assuming that the car's value is linear for the first 5 years.
- B. According to your model, how much did the car's value drop the day it was purchased and driven off the lot?
- C. Do you think the linear model would still be useful after 10 years? Explain.
- D. Suppose you used months instead of years to write a function. How would your model change?

Wildlife Field Researcher Alexa is a wildlife field researcher who is studying the American black bear. American black bears are the most common bears in the United States. They can be found in 11 of the 21 counties in New Jersey. Most wild male black bears weigh between 125 and 600 pounds, while females generally weigh between 90 and 300 pounds. Their weight depends upon their age, the season of the year, and how much food is available.

- Write inequalities to show the range of weights for male and female black bears.
- Black bears hibernate for about 5 months in the winter. They must store 50 to 60 pounds of fat to survive hibernation. During the month before hibernation, a black bear may consume up to 20,000 Calories per day. If a bear consumes an average of 18,500 Calories per day in the month of August, about how many total calories will he consume that month?
- Use the graph to estimate how much a male bear, weighing $\frac{2}{3}$ pound at birth and 400 pounds at the age of his death, 20 years, weighed when he was 7 years old.
- A white-tailed deer is running from a black bear at 20 miles per hour. It is $\frac{1}{3}$ mile in front of the bear. The bear is running at 30 miles per hour. How many minutes will it take the bear to catch the deer? Assume both continue running at a constant pace.
- During the hibernation months, the bear's heart rate slows to about 10 beats per minute. If the bear hibernates for 155 days, how many times will its heart beat?



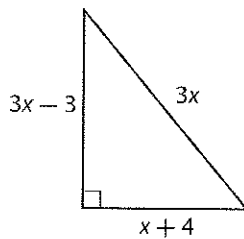


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1. Solve each equation. Is the correct solution given?
- A. $-4(p + 3) = -3p - 7; p = -5$ Yes No
- B. $8r - 18 = -14; r = \frac{1}{2}$ Yes No
- C. $\frac{1}{5} - 2 = -5; t = 15$ Yes No
2. Simplify $5x^2\left(\frac{2}{5} - x\right)$. Determine if each statement is True or False.
- A. The expression is a trinomial. True False
- B. The expression has a degree of 3. True False
- C. The expression has a constant term of -2 . True False
3. Is the given polynomial in standard form?
- A. $-5y^2 + 5y + 24$ Yes No
- B. $7x^5 - 19 + x$ Yes No
- C. $15z - 3$ Yes No
4. Simplify $(3x - 8)(x + 2)$. Is the given statement True or False?
- A. The coefficient of the x -term is -2 . Yes No
- B. The leading term is $3x^2$. Yes No
- C. The constant term is -16 . Yes No
5. Is the product of each of the following pairs of factors a difference of squares?
- A. $3(x - 3)$ Yes No
- B. $4(4x^2 - 1)$ Yes No
- C. $(5x - 2)(5x + 2)$ Yes No
6. Write the difference of the following polynomials in standard form:
 $(11 - 8y + 2y^2) - (y^2 - 15)$. Classify the difference by its degree and number of terms.

7. Sandra has been offered two jobs. Job A pays \$25,000 a year with an 8% raise each year. Job B pays \$28,000 a year with a \$2,500 raise each year. Write a function to represent each salary t years after being hired. Use a graphing calculator to compare the two salary plans. Will Job A ever have a higher salary than Job B? If so, after how many years will this occur? Explain how you solved this problem.

8.



Write an expression that represents the perimeter of the triangle in terms of x and an expression that represents the area of the triangle in terms of x . If the perimeter is 36 cm, what is the area of the triangle? Explain how you solved this problem.

Performance Tasks

- ★ 9. The profits of two different manufacturing plants can be modeled as shown.

$$\text{Eastern: } -0.03x^2 + 25x - 1500$$

$$\text{Southern: } -0.02x^2 + 21x - 1700$$

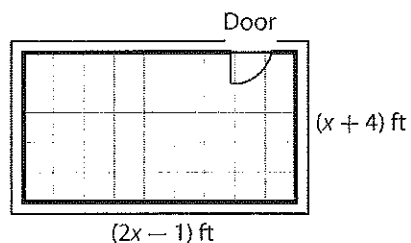
- A. Write a polynomial that represents the difference of the profits at the Eastern plant and the profits at the Southern plant.
- B. Write a polynomial that represents the total profits from both plants.

★★10. A rectangular swimming pool is 25 feet long and 10 feet wide. It is surrounded by a fence that is x feet from each side of the pool.

A. Draw a diagram of the situation.

B. Write expressions for the length, width, and area of the fenced region.

★★★11. Tammy plans to put a wallpaper border around the perimeter of her room. She will not put the border across the doorway, which is 3 feet wide.



A. Write a polynomial that represents the number of feet of wallpaper border that Tammy will need.

B. A local store has 50 feet of the border that Tammy has chosen. What is the greatest whole-number value of x for which this amount would be enough for Tammy's room? Justify your answer.

C. Determine the dimensions of Tammy's room for the value of x that you found in part B.

Camp Director For the initial year of a summer camp, 44 girls and 56 boys enrolled. Each year thereafter, 5 more girls and 8 more boys enrolled in the camp.

- a. Let t be the time (in years) since the camp opened. Write a rule for each of the following functions:
 - $g(t)$, the number of girls enrolled as a function of time t
 - $b(t)$, the number of boys enrolled as a function of time t
 - $T(t)$, the total enrollment as a function of time t
- b. The cost per child each year was \$200. Write a rule for each of the following functions:
 - $C(t)$, the cost per child as a function of time t
 - $R(t)$, the revenue generated by the total enrollment as a function of time t
- c. Explain why $C(t)$ is a constant function.
- d. What was the initial revenue for the camp? What was the annual rate of change in the revenue?
- e. The camp director had initial expenses of \$18,000, which increased each year by \$2,500. Write a rule for the expenses function $E(t)$. Then write a rule for the profit function $P(t)$ based on the fact that profit is the difference between revenue and expenses.



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1. Consider the graph of $f(x) = -2x^2 - \frac{1}{2}$.

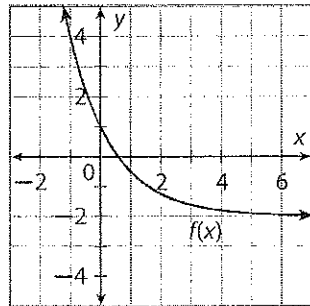
Determine if each statement is True or False.

- A. The vertex is $(-2, \frac{1}{2})$. True False
- B. The maximum value is $-\frac{1}{2}$. True False
- C. The axis of symmetry is $x = -2$. True False

2. Does the given statement describe a step in the transformation of the graph of $f(x) = x^2$ that would result in the graph of $g(x) = -5(x+2)^2$?

- A. The parent function is reflected across the x -axis. Yes No
- B. The parent function is stretched by a factor of 5. Yes No
- C. The parent function is translated 2 units up. Yes No

3. Use the graph of $f(x)$ to determine if each statement is True or False.



- A. As $x \rightarrow \infty$, $y \rightarrow -2$. True False
- B. The graph represents a quadratic function. True False
- C. When $f(x) = 1$, $x = 0$. True False

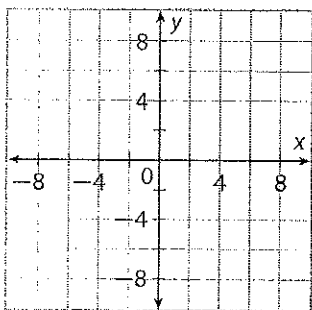
4. Solve $(2x + \frac{2}{3})(x + 5) = 0$. Is each of the following a solution of the equation?

- A. $x = -\frac{1}{3}$ Yes No
- B. $x = -5$ Yes No
- C. $x = \frac{2}{3}$ Yes No

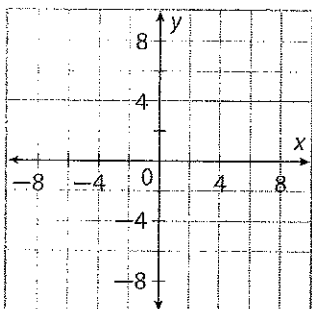
5. Use the table of values for $h(x)$ to determine if each statement is True or False.

x	-4	-2	0	2	4
$h(x)$	3	0	-3	0	3

- A. A zero of the function is -3 . True False
- B. A zero of the function is -2 . True False
- C. A solution of the equation $h(x) = 0$ is $x = 2$. True False
6. Graph $y = -2x^2 + 16x - 31$. What is the axis of symmetry of the graph? What is its vertex?



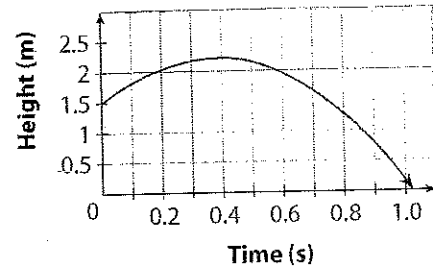
7. Graph $t(x) = \frac{1}{2}(x + 2)(x - 4)$, and write the function in standard form.



Performance Tasks

- ★ 8. A rectangular picture measuring 6 in. by 10 in. is surrounded by a frame with uniform width x .
- A. Write a quadratic function to show the combined area of the picture and frame.
- B. Write a quadratic function for the area of the frame.

- ★★ 9. **Estimation** The graph shows the approximate height y in meters of a volleyball x seconds after it is served.
- Estimate the time it takes for the volleyball to reach its greatest height.
 - Estimate the greatest height that the volleyball reaches.
 - If the domain of a quadratic function is all real numbers, why is the domain of this function limited to nonnegative numbers?



- ★★★10. A rocket team is using simulation software to create and study water bottle rockets. The team begins by simulating the launch of a rocket without a parachute. The table gives data for one rocket design.
- Show that the data represent a quadratic function.
 - Graph the function.
 - The acceleration due to gravity is 9.8 m/s^2 . How is this number related to the data for this water bottle rocket?

Time (s)	Height (m)
0	0
1	34.3
2	58.8
3	73.5
4	78.4
5	73.5
6	58.8
7	34.3
8	0

Transportation Engineer The Center for Transportation Analysis in the Oak Ridge National Laboratory publishes data about the transportation industry. One study relates gas mileage and a car's speed. The mileage (in miles per gallon) for a particular year, make, and model of car is shown in the table.

Speed (miles per hour)	Gas Mileage (miles per gallon)
40	23.0
50	27.3
55	29.1
60	28.2
70	22.9

- Identify the independent and dependent variables in this situation. State the units associated with each variable.
- Make a scatter plot of the data, and sketch a parabola that you think best fits the plotted points. (You will not be able to make the parabola pass through all the points. Instead, you should try to draw the parabola so that some points fall above it and some below it.) Explain why a parabola is a reasonable curve to fit to the data.
- Write the equation for a function of the form $m(s) = a(s - h)^2 + k$, where s is the speed and m is the gas mileage. Use the coordinates of the vertex of your parabola to determine h and k , and a point on your parabola other than the vertex to solve for the unknown a .
- Suppose that when the car was driven at a steady speed, its gas mileage was 25 miles per gallon. Describe how you can use your model to find the car's speed. Is only one speed or more than one speed possible? Explain, and then find the speed(s).