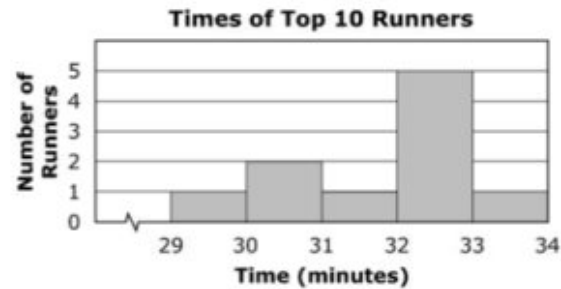Last weekend, 625 runners entered a 10,000-meter race. A 10,000-meter race is 6.2 miles long. Ruben won the race with a finishing time of 29 minutes 51 seconds.

The graphs show information about the top 10 runners.

Ages of Top 10 Runners
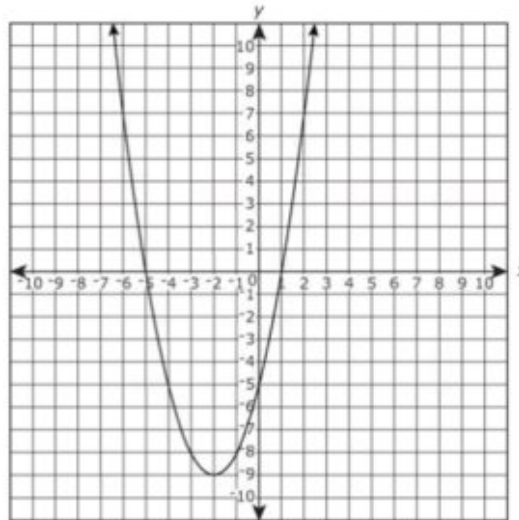

Times of Top 10 Runners

Formula Sheet

Calculator Reference

Type your answer in the boxes. You may use numbers and/or a negative sign (-) in your answer.

A total of 42 runners dropped out before finishing the race. What is the probability, written as a fraction, that a randomly chosen runner who started the race finished the race?

583 / 625

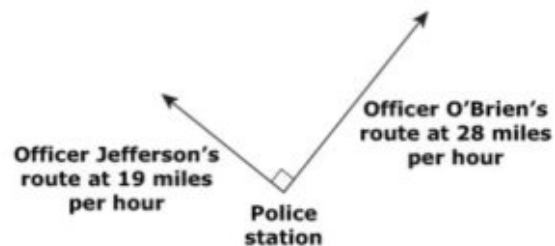The graph of the equation $y = x^2 + 4x - 5$ is shown on the grid.

Which statement is true when $y = 0$?

◉ $x = -5$ and $x = 1$

○ $x = -5$ and $x = 0$

○ $x = -9$

○ $x = -2$

Type your answer in the box. You may use numbers, a decimal point (.), and/or a negative sign (-) in your answer.

What is the value of $x^3 - 2y + 3$ if $x = -5$ and $y = -2$?

-118

Officer Jefferson and Officer O'Brien leave the police station at the same time. They use handheld radios to communicate. Each radio has a range of 16 miles. The figure shows the routes and speeds each officer drives from the police station.

Officer O'Brien's route at 28 miles per hour

Officer Jefferson's route at 19 miles per hour

Police station

Which equation can be used to calculate t, the maximum amount of time, in hours, the officers will be able to communicate with each other using the handheld radios?

◉ $(19t)^2 + (28t)^2 = 256$

○ $(16t)^2 + (19t)^2 = 784$

○ $19t^2 + 28t^2 = 256$

○ $16t^2 + 19t^2 = 784$

A cyclist can travel 17.6 feet per second. The cyclist would have a better understanding of her speed if it were measured in miles per hour. Which of these completes the expression used to convert the speed of the cyclist to miles per hour?

$$\frac{17.6 \text{ feet}}{1 \text{ second}} \cdot \frac{60 \text{ seconds}}{1 \text{ minute}} \cdot \boxed{?}$$

○ $\frac{12 \text{ inches}}{1 \text{ foot}} \cdot \frac{60 \text{ minutes}}{1 \text{ hour}}$

◉ $\frac{60 \text{ minutes}}{1 \text{ hour}} \cdot \frac{1 \text{ mile}}{5,280 \text{ feet}}$

○ $\frac{1 \text{ hour}}{60 \text{ seconds}} \cdot \frac{1 \text{ mile}}{5,280 \text{ feet}}$

○ $\frac{60 \text{ minutes}}{1 \text{ hour}} \cdot \frac{5,280 \text{ feet}}{1 \text{ mile}}$

The Great Pyramid at Giza in Egypt is a square pyramid that measures approximately 756 feet on each side. The height of the pyramid is approximately 450 feet. What is the approximate volume, in cubic feet, of the pyramid?

- ○ 453,600
- ○ 51,030,000
- ○ 226,800
- ◉ 85,730,400

What is the equation of a line with a slope of 5 that passes through the point at $(-2, -7)$?

Click on the numbers you want to select and drag them into the boxes.
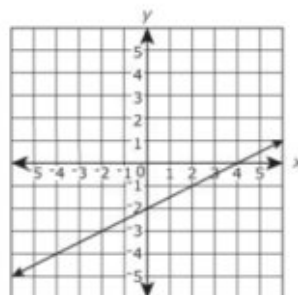
$y =$ | 5 | $x +$ | 3 |

| -7 | 17 | 3 | -17 |

| -5 | -3 | 33 | 5 |

The equation and the graph represent two linear functions.
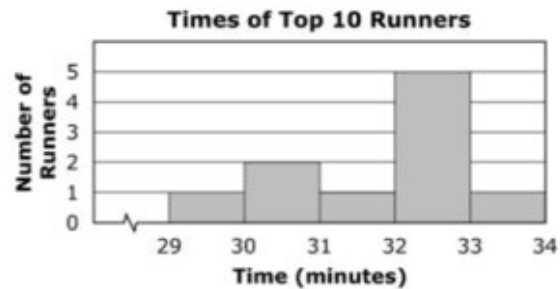
Function P: $f(x) = 4 - 6x$

Function Q:

Which statement compares the y-intercepts of function P and function Q?

○ The y-intercept of function P is 4 which is equal to the y-intercept of function Q.

◉ The y-intercept of function P is 4 which is greater than the y-intercept of function Q.

○ The y-intercept of function P is −6 which is less than the y-intercept of function Q.

○ The y-intercept of function P is −6 which is greater than the y-intercept of function Q.

Last weekend, 625 runners entered a 10,000-meter race. A 10,000-meter race is 6.2 miles long. Ruben won the race with a finishing time of 29 minutes 51 seconds.

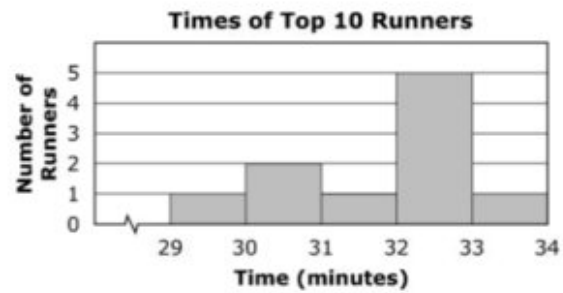The graphs show information about the top 10 runners.

Ages of Top 10 Runners

Times of Top 10 Runners

Formula Sheet

Calculator Reference

Based on the histogram, which statement describes the finishing time of the runner in position 3?

○ The finishing time was between 32 and 33 minutes.

○ The finishing time was between 31 and 32 minutes.

◉ The finishing time was between 30 and 31 minutes.

○ The finishing time was between 33 and 34 minutes.

Last weekend, 625 runners entered a 10,000-meter race. A 10,000-meter race is 6.2 miles long. Ruben won the race with a finishing time of 29 minutes 51 seconds.

The graphs show information about the top 10 runners.

Ages of Top 10 Runners

Times of Top 10 Runners

Formula Sheet

Calculator Reference

Based on the scatter plot, what is the range of ages of the top 10 runners?

- ◉ 16
- ○ 40
- ○ 9
- ○ 1

Factor the expression completely.

$$-3x - 21$$

- ○ $-3(x + 21)$
- ◉ $-3(x + 7)$
- ○ $-3(x - 21)$
- ○ $-3(x - 7)$

The U.S. Department of Agriculture recommends eating 2–4 servings of fruit per day in a healthy diet. The table shows types of fruit and calories per serving.
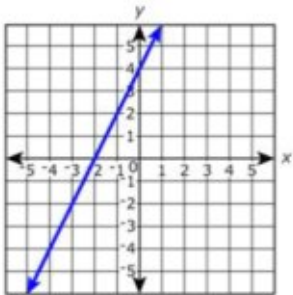
Fruit	Calories per Serving
apple	65
banana	50
blueberries, 1 cup	50
mandarin orange	35
pear	75
plum	35
tangerine	35
watermelon, thick slice	70

Scott plans to eat 4 servings of fruit today. He has already eaten 1 cup of blueberries and 1 apple. Which additional fruit choices can he eat to end up with a mean of 50 calories of fruit per serving today?
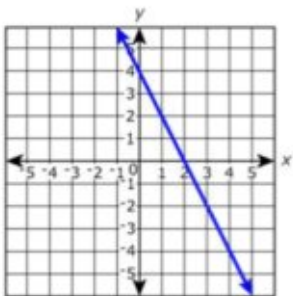
- ○ 1 plum and 1 tangerine
- ◉ 1 banana and 1 mandarin orange
- ○ 1 cup of blueberries and 1 banana
- ○ 1 apple and 1 plum
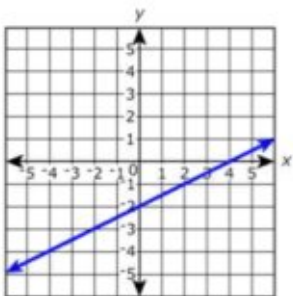
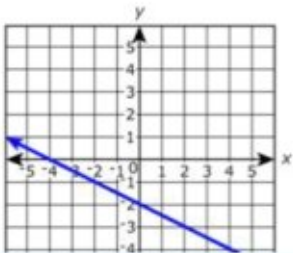Which graph represents the equation $x - 2y = 4$?

○

○

○

◉

Ricardo has two bank accounts. Each month, he will withdraw a certain amount of money from the first account and deposit a different amount of money into the second account. The inequality $8,000 - 200x \geq 5,000 + 300x$ can be solved to find the number of months, x, for which the first account has more money than the second account. What is the solution to this inequality?

○ $x \leq 30$

◉ $x \leq 6$

○ $x \geq 6$

○ $x \geq 30$

Type your answer in the box. You may use numbers and/or a negative sign (-) in your answer.

The world's highest suspension bridge spans the Arkansas River at a height of 1,053 feet above the water. If a ball is dropped from the bridge, the height of the ball, in feet, after t seconds can be modeled by the equation
$f(t) = -16t^2 + 1,053.$ How many feet above the water is the ball 7 seconds after being dropped?

269

A manufacturing plant makes dog toys in the shape of a sphere. The diameter of each dog toy is 3 inches. What is the surface area, in square inches, of each dog toy?
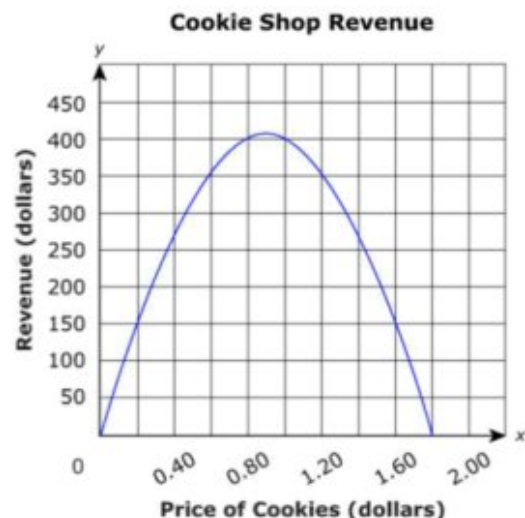
- ○ 113.04
- ◉ 28.26
- ○ 37.68
- ○ 75.36

Type your answer in the box. You may use numbers, a decimal point (.), and/or a negative sign (-) in your answer.

What is the value of $x^3 - 2y + 3$ if $x = -5$ and $y = -2$?

-118

The owner of a small cookie shop is examining the shop's revenue and costs to see how she can increase profits. Currently, the shop has expenses of $41.26 and $0.19 per cookie.

The shop's revenue and profit depend on the sales price of the cookies. The daily revenue is given in the graph below, where x is the sales price of the cookies and y is the expected revenue at that price.

Cookie Shop Revenue

The equation $P = -500x^2 + 995x - 212.26$ can be used to find the daily profit, P dollars, when the sales price of a cookie is x dollars.

The owner has decided to take out a loan to purchase updated equipment. A bank has agreed to loan the owner $2,000 for the purchase of the equipment at a simple interest rate of 4.6%, payable over 3 years.

The owner is also researching less expensive sources for the cookie ingredients. One source offers 200 pounds of chocolate chips for $855.59. This price would be a savings of $20.40 against what she is currently paying for the same amount of chocolate chips.

The shop owner needs to determine the total cost of making different amounts of cookies on any one day. Create a linear equation that can be used to determine the daily cost, C, of making n cookies.

Click on the numbers you want to select and drag them into the boxes.

$$C = \boxed{0.19} \; n \; + \; \boxed{41.26}$$

0.046		
	4.6	20.4
212.26	855.6	995

Formula Sheet   Calculator Reference

An expression is shown.

$$\frac{t^3 - 35t^2}{-4t - 8}$$

To the nearest tenth, what is the value of this expression when $t = 12$?

○   14.4

○   87.4

○   23.0

◉   59.1

Formula Sheet

Calculator Reference

What is the equation, in standard form, of the line that passes through the points $(-3, -4)$ and $(3, -12)$?

○ $4x + 3y = 24$

○ $3x + 4y = -39$

○ $3x + 4y = -25$

◉ $4x + 3y = -24$

Two points are shown on the graph.

Create an equation that can be used to determine the slope of the line formed by the two points. Click on the variables you want to select and drag them into the boxes.

$$\text{slope} = \frac{\boxed{d} - \boxed{b}}{\boxed{c} - \boxed{a}}$$

Factor the expression completely.

$$-3x - 21$$

○ $-3(x + 21)$

● $-3(x + 7)$

○ $-3(x - 21)$

○ $-3(x - 7)$

John and Mike are participating in a long-distance bicycling event. Mike bicycled 24 miles in the first 2 hours. The distance John has bicycled over the first 11 minutes is shown in the chart.

John's Bicycling

Total Time (minutes)	Total Distance (miles)
5	1.25
7	1.75
11	2.75

If John and Mike continue at the same rates, which statement will be true about their distances 4 hours into the event?

○ Mike will be 6 miles ahead of John.

○ John will be 12 miles ahead of Mike.

◉ John will be 6 miles ahead of Mike.

○ Mike will be 12 miles ahead of John.

Formula Sheet

Type your answer in the box. You may use numbers, a decimal point (.), and/or a negative sign (-) in your answer.

Carol's regular workweek is 37 hours and 45 minutes. If she receives a $0.40 per hour raise, how much more money will she make in a regular workweek?

$ 15.10

What is the area, in square inches, of a circle with diameter 2 inches?

○   12.56

○   1.00

○   6.28

◉   3.14

Multiply.

$$\left(x^2 - 3\right)\left(x^5 + 2x^3\right)$$

What terms would appear in the simplified answer?

Click on each term you want to select.

| -6 | $6x^3$ ✓ | $-3x^5$ | x^5 ✓ | $2x^5$ |

| $5x^5$ | $2x^6$ | ✓ | x^{10} |

What is the slope of a line perpendicular to the line given by the equation $5x - 2y = -10$?

- ○ $-\dfrac{5}{2}$

- ◉ $-\dfrac{2}{5}$

- ○ $\dfrac{2}{5}$

- ○ $\dfrac{5}{2}$

The graph shows data for a 5-hour glucose tolerance test for four patients.

5-Hour Glucose Tolerance Test

Symptoms of a patient with diabetes during a 5-hour glucose tolerance test include a high blood-glucose level that increases quickly and then decreases only minimally over the 5-hour period. Which patient displays symptoms of diabetes?

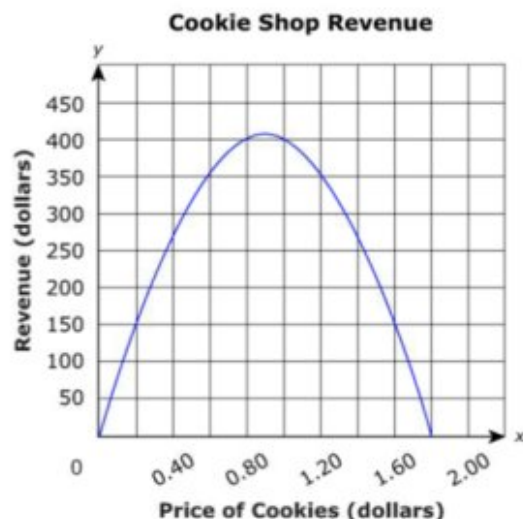- ○ patient 4
- ○ patient 3
- ○ patient 2
- ◉ patient 1

Solve the inequality for x.

$$\frac{1}{8}x \le \frac{1}{2}x + 15$$

○ $x \le -24$

○ $x \ge -24$

○ $x \le -40$

◉ $x \ge -40$

The owner of a small cookie shop is examining the shop's revenue and costs to see how she can increase profits. Currently, the shop has expenses of $41.26 and $0.19 per cookie.

The shop's revenue and profit depend on the sales price of the cookies. The daily revenue is given in the graph below, where x is the sales price of the cookies and y is the expected revenue at that price.

Cookie Shop Revenue

Price of Cookies (dollars)

The equation $P = -500x^2 + 995x - 212.26$ can be used to find the daily profit, P dollars, when the sales price of a cookie is x dollars.

The owner has decided to take out a loan to purchase updated equipment. A bank has agreed to loan the owner $2,000 for the purchase of the equipment at a simple interest rate of 4.6%, payable over 3 years.

The owner is also researching less expensive sources for the cookie ingredients. One source offers 200 pounds of chocolate chips for $855.59. This price would be a savings of $20.40 against what she is currently paying for the same amount of chocolate chips.

Formula Sheet

Calculator Reference

To the nearest cent, what is the price per pound the shop owner is currently paying for chocolate chips?

- ◉ $4.38
- ○ $0.23
- ○ $0.10
- ○ $4.28

The owner of a small cookie shop is examining the shop's revenue and costs to see how she can increase profits. Currently, the shop has expenses of $41.26 and $0.19 per cookie.

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The owner is also researching less expensive sources for the cookie ingredients. One source offers 200 pounds of chocolate chips for $855.59. This price would be a savings of $20.40 against what she is currently paying for the same amount of chocolate chips.

To the nearest dollar, what is the total amount the shop owner will pay on the loan over the 3 years?

- ◉ $2,276
- ○ $2,760
- ○ $2,028
- ○ $2,092

Formula Sheet

506735871

A list of numbers is shown.

$$-\frac{2}{9}, -0.21, -\frac{2}{11}, -0.2, -1$$

Which list shows the numbers arranged from least to greatest?

○ $-1, -\frac{2}{9}, -0.21, -0.2, -\frac{2}{11}$

○ $-\frac{2}{11}, -0.2, -0.21, -\frac{2}{9}, -1$

○ $-\frac{2}{9}, -0.21, -0.2, -\frac{2}{11}, -1$

○ $-1, -\frac{2}{11}, -0.21, -0.2, -\frac{2}{9}$

Formula Sheet

What is the value of $0.6 - (0.7)(1.4)$?

- ● -0.38
- ○ -1.50
- ○ -0.42
- ○ -0.14

506735871

Type your answer in the box. You may use numbers, a decimal point (.), and/or a negative sign (-) in your answer.

What is the distance between -4 and 1 on a number line?

5

Simplify.

$$\sqrt[3]{120}$$

- ⦿ $2\sqrt[3]{15}$
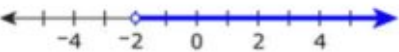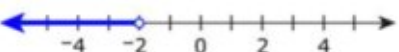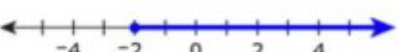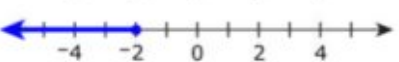- ○ 40
- ○ 60
- ○ $8\sqrt[3]{15}$

506735871

What is the value of $(-5)^4$?

○   −625

○   −20

○   20

◉   **625**

Which graph represents the solution of $x + 5 \leq 3$?

○

○

○

◉

On Monday, Alicia buys x shirts at \$8 each and y slacks at \$25 each. On Wednesday, Alicia returns 2 pairs of slacks. Which expression represents the total value of her purchases?

- ◉ $8x + 25(y - 2)$
- ○ $8x + 25y - 2$
- ○ $8x + 23y$
- ○ $8(x - 2) + 25y$

John and Mike are participating in a long-distance bicycling event. Mike bicycled 24 miles in the first 2 hours. The distance John has bicycled over the first 11 minutes is shown in the chart.

John's Bicycling

Total Time (minutes)	Total Distance (miles)
5	1.25
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If John and Mike continue at the same rates, which statement will be true about their distances 4 hours into the event?

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○ John will be 12 miles ahead of Mike.

● John will be 6 miles ahead of Mike.

○ Mike will be 12 miles ahead of John.

506735871

The equation $C = 24n + 2$ represents the cost, C, in dollars, of buying n tickets to a play. Jim's ticket order cost $98, and Larry's ticket order cost $170. How many more tickets did Larry buy than Jim?

- ○ 6
- ○ 12
- ⊙ 3
- ○ 1

Which table shows a function?

○

x	y
−3	−5
−3	−9
−3	−2

◉

x	y
1	5
3	5
7	5

○

x	y
−2	0
0	1
−2	−5

○

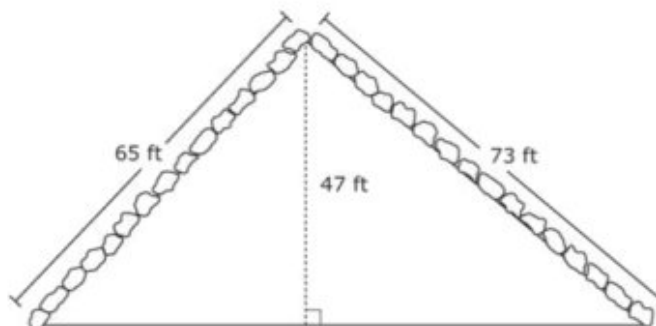| x	y
2	−4
2	3
5	8

506735871

The factors of $2x^2 - xy - 3y^2$ are $(x + y)$ ▾ and $(2x - 3y)$. ▾

The space shuttle *Discovery* traveled 148.2 million miles during its mission. The space shuttle *Atlantis* traveled 125.9 million miles. How many more miles did the space shuttle *Discovery* travel than the space shuttle *Atlantis*?

- ○ 274,100 miles
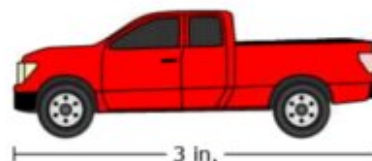- ○ 274,100,000 miles
- ○ 22.3 miles
- ◉ 22,300,000 miles

A landscape worker is building a rock wall around a triangular flower garden. He has completed the rock wall on two sides of the garden.

The perimeter of the garden is 239 feet. What is the length, in feet, of the rock wall that the worker still needs to complete?

○ 185

○ 54

○ 138

◉ 101

A scale drawing of a truck has a length of 3 inches (in.), as shown below.

├─────── 3 in. ───────┤

The actual truck has a length of 18 feet (ft). What scale was used for the drawing?

○   15 in. = 1 ft

○   6 in. = 1 ft

◉   1 in. = 6 ft

○   1 in. = 15 ft