ALEKS®

Class Name : **Lacoste College Algebra Spring 2020 - CRN22385 MW3**
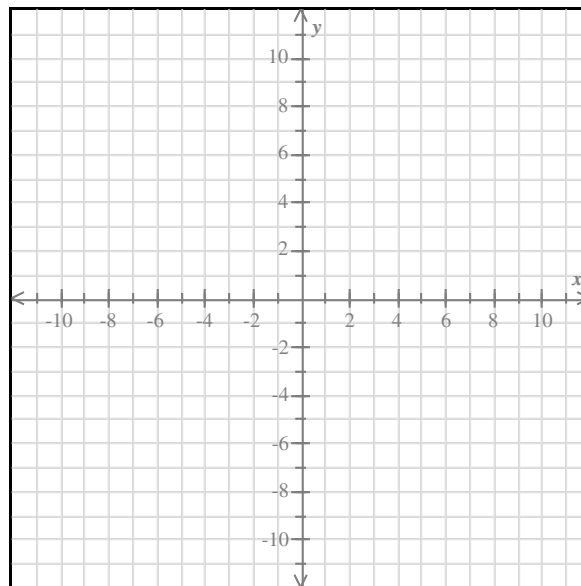
Instructor Name : **Prof. Lacoste**

Student Name : _____

Instructor Note : **All Practice Problems for Exam 3. There are multiple versions so that you can try challenging problems more than once. Contact me if you need even more versions.**
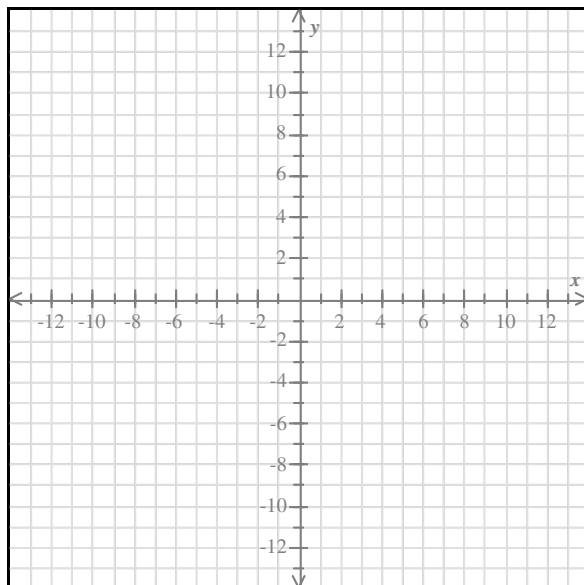
Question 1 of 58

Graph the equation.

$$y = 2\,|x|$$

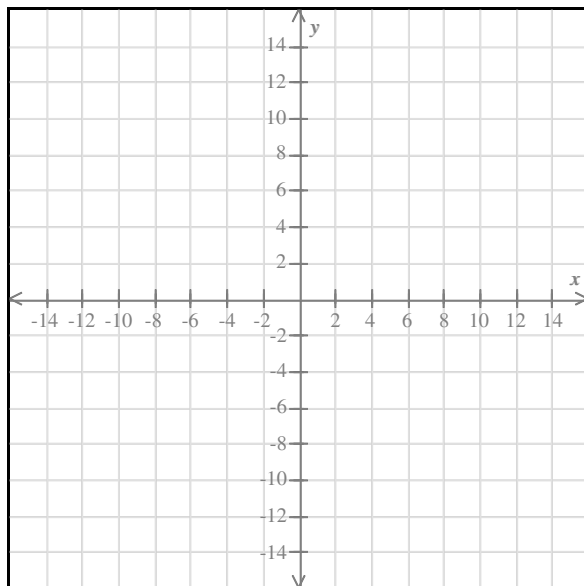Graph the parabola.

$$y = 3x^2$$

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Graph

$$y = -\frac{3}{2}x^3.$$

The function f is defined as follows.

$$f(x) = \sqrt[3]{x} - 1$$

Find $f(-64)$ and $f(27)$.

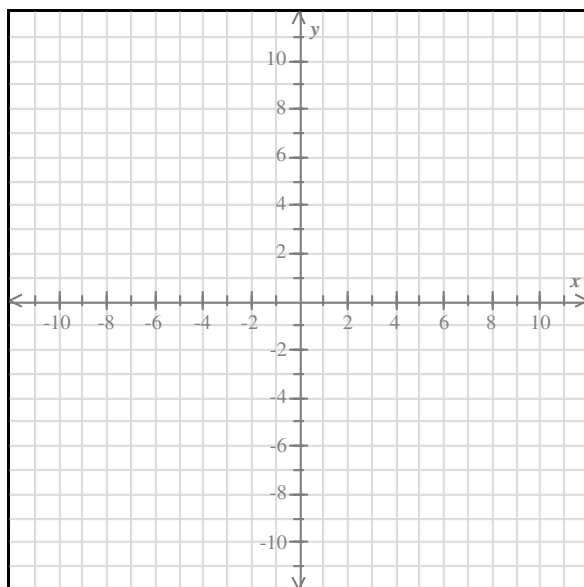$$f(-64) = \boxed{}$$

$$f(27) = \boxed{}$$
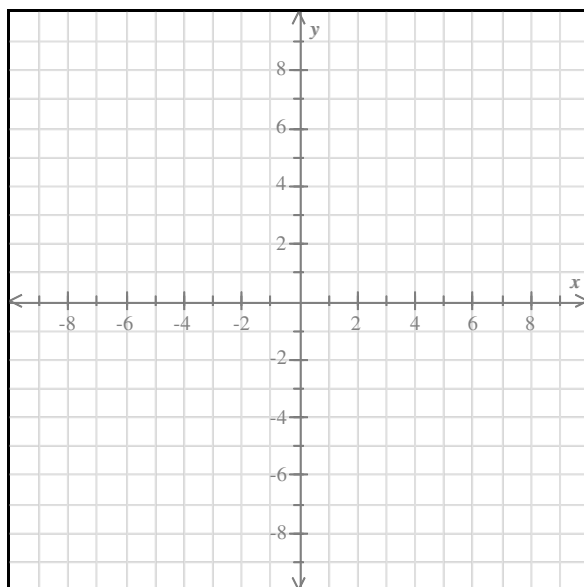
Graph the equation.

$$y = 4\left|x-2\right| + 3$$

Graph the parabola.

$$y = (x-5)^2 + 1$$
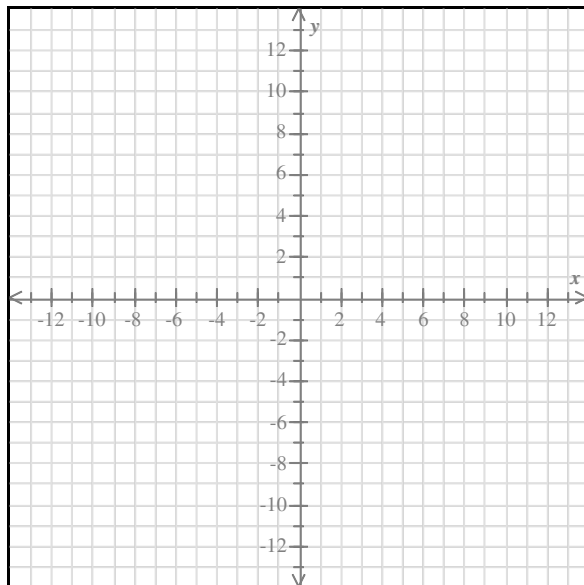
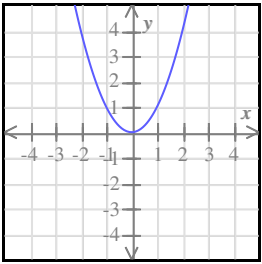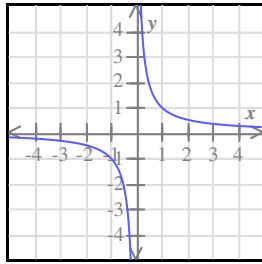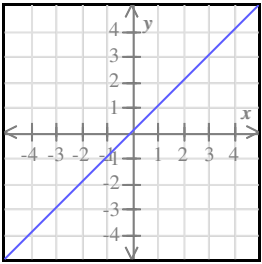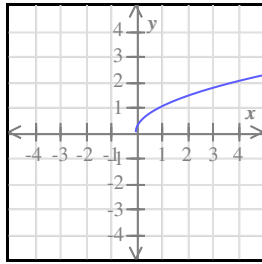Graph the function $f(x) = \sqrt{x} + 7$.
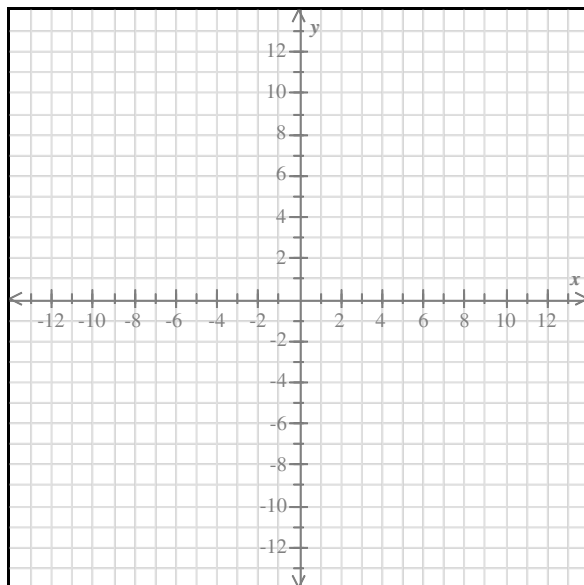
Graph the function $f(x) = \sqrt{x+2} + 1$.

Graph the following function.

$$f(x) = \sqrt[3]{x+1}$$
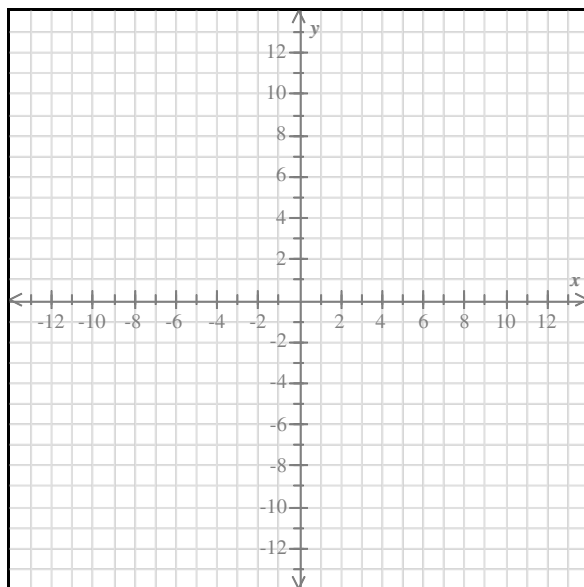
For each graph, choose the function that best describes it.

(a)

- ○ $f(x) = 1$
- ○ $f(x) = x$
- ○ $f(x) = x^2$
- ○ $f(x) = x^3$
- ○ $f(x) = \sqrt{x}$
- ○ $f(x) = |x|$
- ○ $f(x) = \dfrac{1}{x}$
- ○ $f(x) = \dfrac{1}{x^2}$

(b)

- ○ $f(x) = 1$
- ○ $f(x) = x$
- ○ $f(x) = x^2$
- ○ $f(x) = x^3$
- ○ $f(x) = \sqrt{x}$
- ○ $f(x) = |x|$
- ○ $f(x) = \dfrac{1}{x}$
- ○ $f(x) = \dfrac{1}{x^2}$

(c)

- ○ $f(x) = 1$
- ○ $f(x) = x$
- ○ $f(x) = x^2$
- ○ $f(x) = x^3$
- ○ $f(x) = \sqrt{x}$
- ○ $f(x) = |x|$
- ○ $f(x) = \dfrac{1}{x}$
- ○ $f(x) = \dfrac{1}{x^2}$

(d)

- ○ $f(x) = 1$
- ○ $f(x) = x$
- ○ $f(x) = x^2$
- ○ $f(x) = x^3$
- ○ $f(x) = \sqrt{x}$
- ○ $f(x) = |x|$
- ○ $f(x) = \dfrac{1}{x}$
- ○ $f(x) = \dfrac{1}{x^2}$

Look at the graphs and their equations below. Then fill in the information about the coefficients A, B, C, and D.
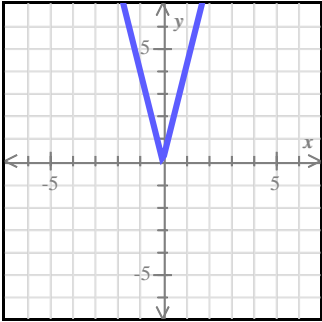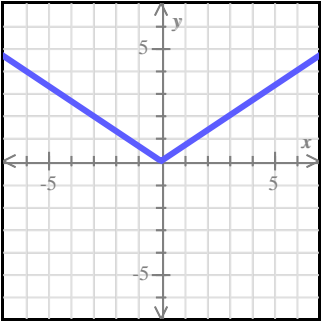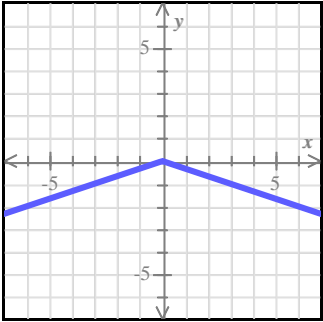
| $y = A\,|x|$ | $y = B\,|x|$ | $y = C\,|x|$ | $y = D\,|x|$ |

	A	**B**	**C**	**D**
(a) For each coefficient, choose whether it is positive or negative.	• Positive • Negative	• Positive • Negative	• Positive • Negative	• Positive • Negative
(b) Choose the coefficient closest to 0.	○	○	○	○
(c) Choose the coefficient with the least value.	○	○	○	○

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Translate each graph as specified below.

(a) The graph of $y = x^2$ is shown. Translate it to get the graph of $y = (x+2)^2$.

(b) The graph of $y = x^2$ is shown. Translate it to get the graph of $y = x^2 - 1$.

Part (a)

Part (b)
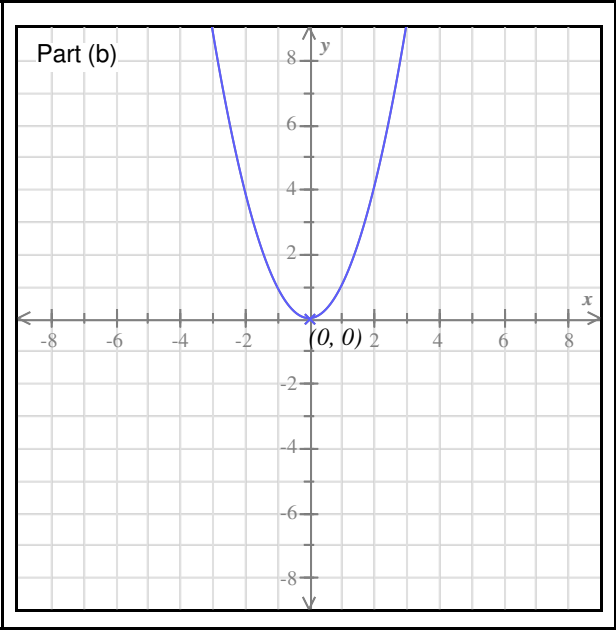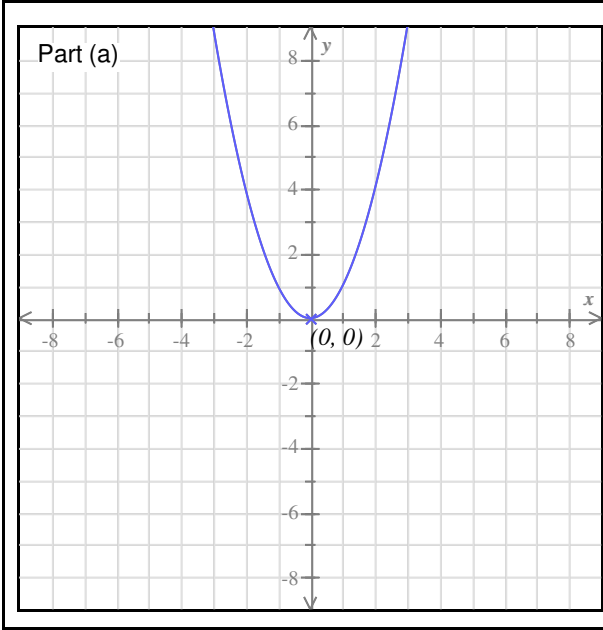
Below is the graph of $y = x^2$.

Translate it to make it the graph of $y = (x - 1)^2 - 4$.
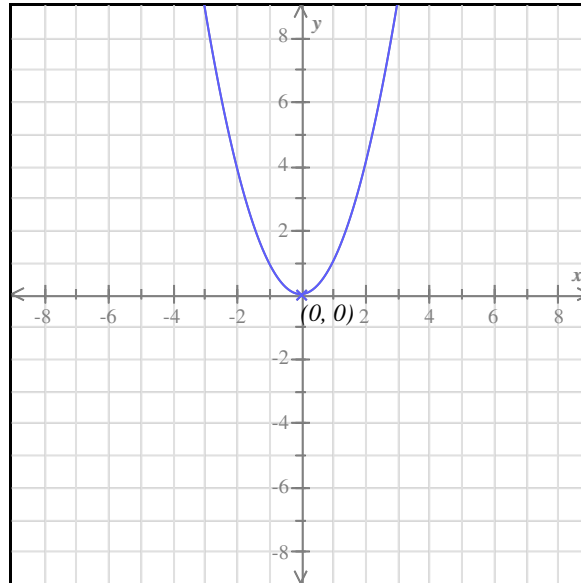
Translate each graph as specified below.

(a) The graph of $y = |x|$ is shown. Translate it to get the graph of $y = |x| + 3$.

(b) The graph of $y = |x|$ is shown. Translate it to get the graph of $y = |x + 4|$.
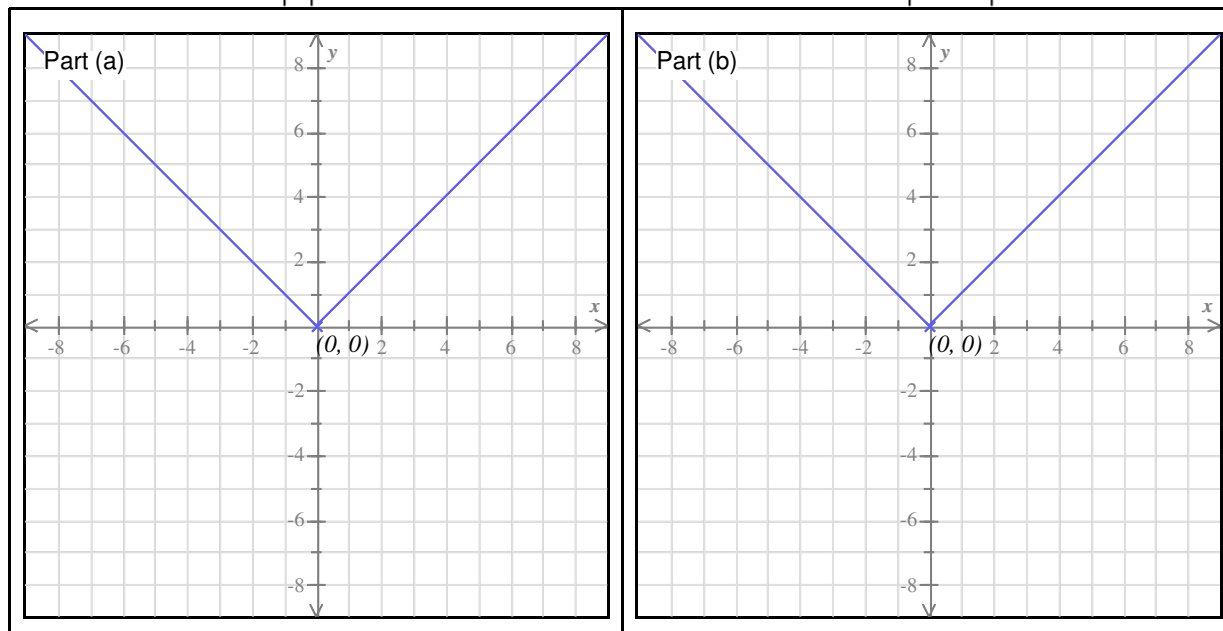
Below is the graph of $y = |x|$.

Translate it to make it the graph of $y = |x + 5| - 4$.
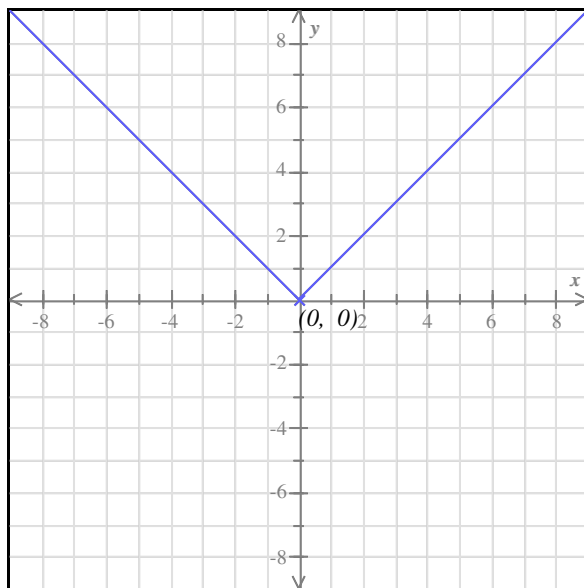
If the graph of the function h defined by

$$h(x) = 4x^2 - 2$$

is translated vertically upward by 8 units, it becomes the graph of a function g.

Find the expression for $g(x)$.

Translate each graph as specified below.

(a) The graph of $y = f(x)$ is shown. Translate it to get the graph of $y = f(x+4)$.

(b) The graph of $y = g(x)$ is shown. Translate it to get the graph of $y = g(x) - 3$.

Part (a)

Part (b)
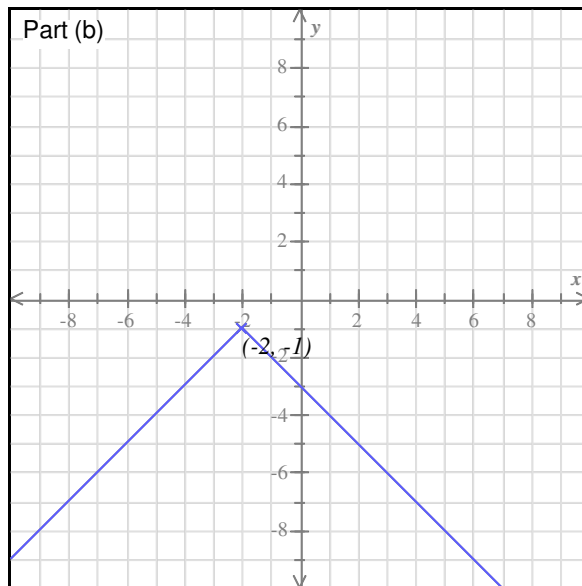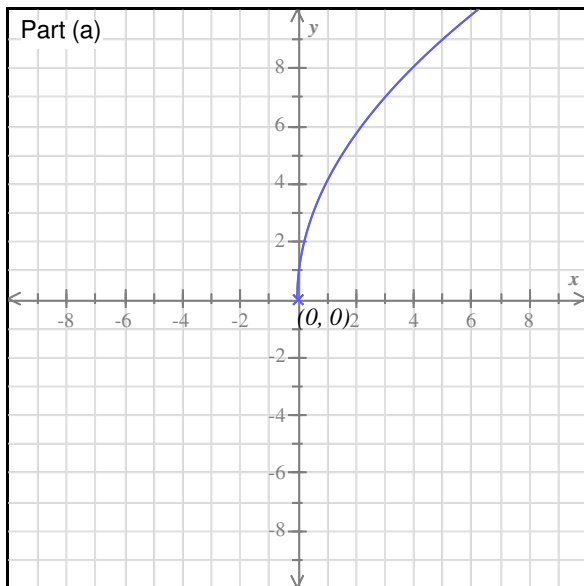
Below is the graph of $y = x^3$.

Translate it to make it the graph of $y = (x+4)^3 + 1$.
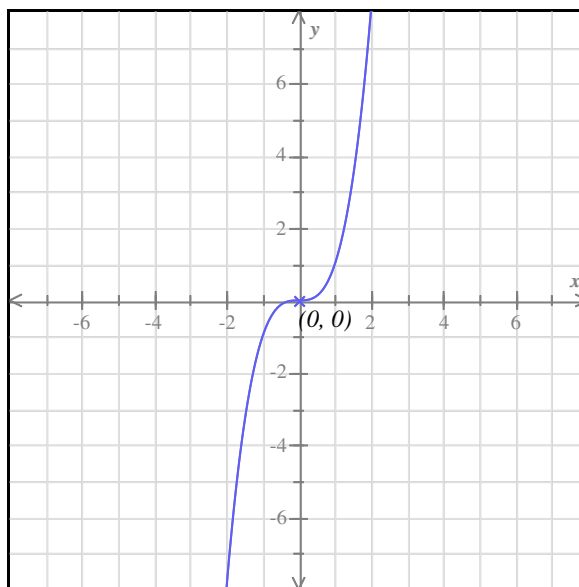
Transform each graph as specified below.

The graph of $y = f(x)$ is shown. Graph $y = \dfrac{1}{2}f(x)$.
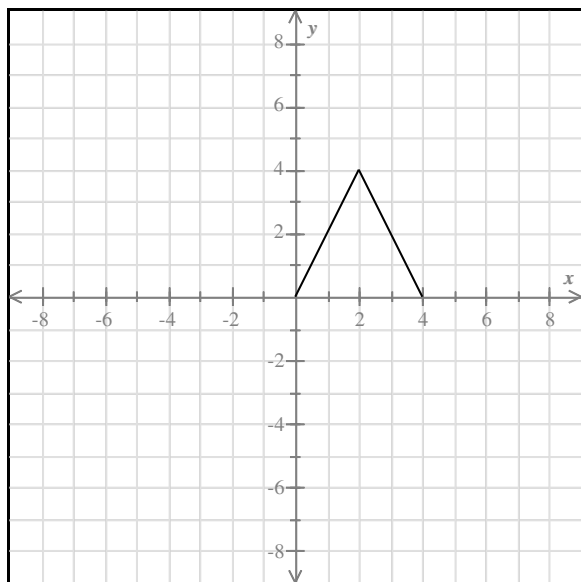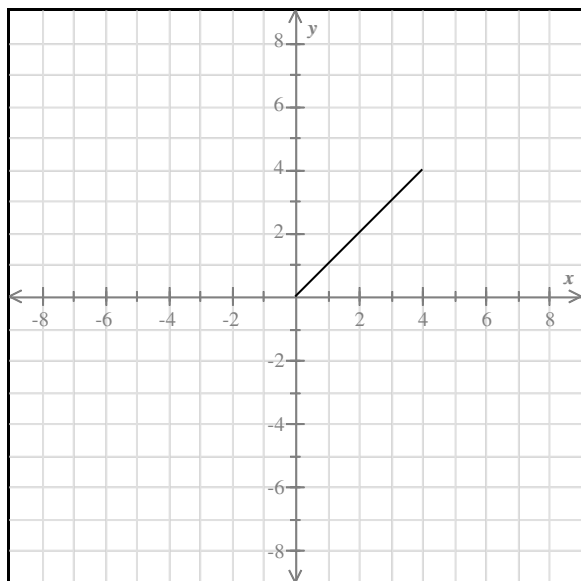
The graph of $y = g(x)$ is shown. Graph $y = g\left(\dfrac{1}{2}x\right)$.

Complete the following.

The graph of $y = g(x)$ is shown. Draw the graph of $y = 2g(x) + 4$.
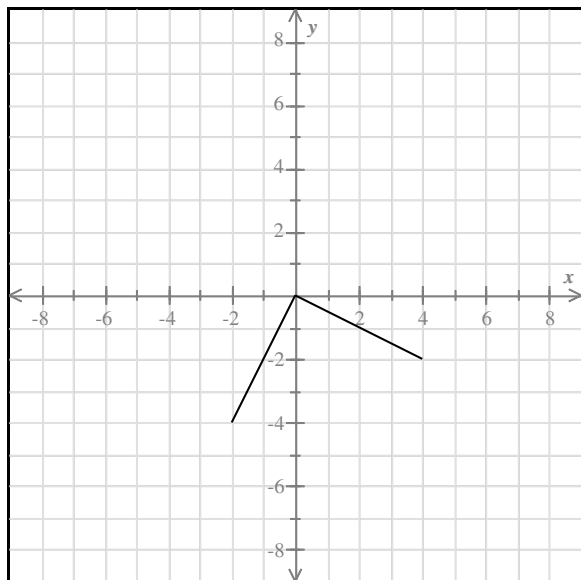
The graph of $y = h(x)$ is shown. Draw the graph of $y = -h(x-2)$.
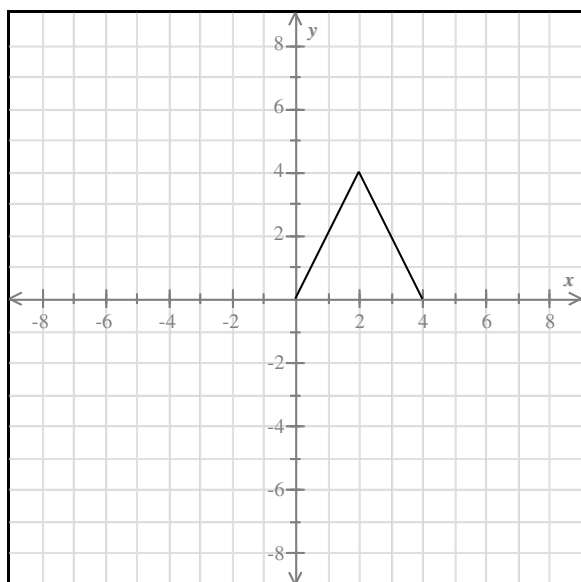
Below is the graph of $y = |x|$.

Transform it to make it the graph of $y = -\dfrac{1}{2}|x| - 2$.
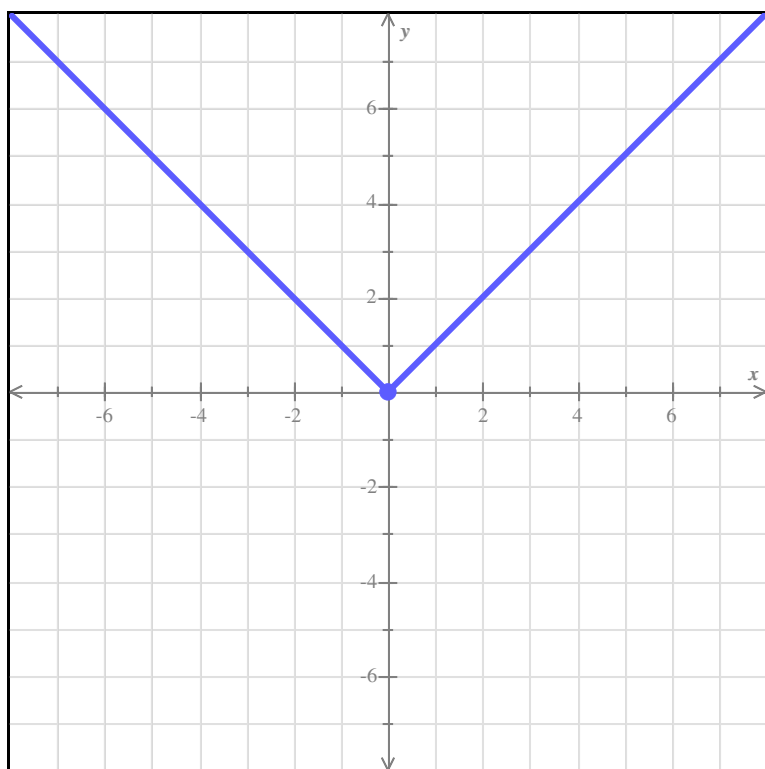
The graph of f (in blue) is translated a whole number of units horizontally and vertically to obtain the graph of h (in red).

The function f is defined by $f(x) = |x|$.
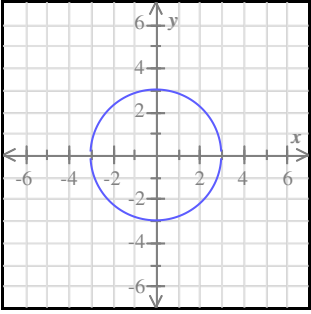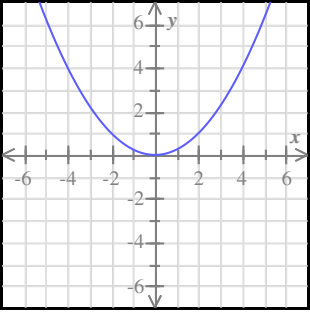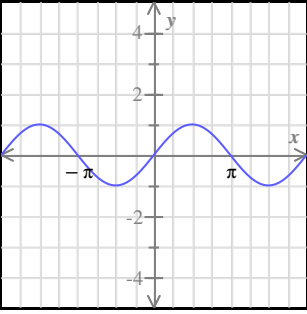
Write down the expression for $h(x)$.

$h(x) =$ _____
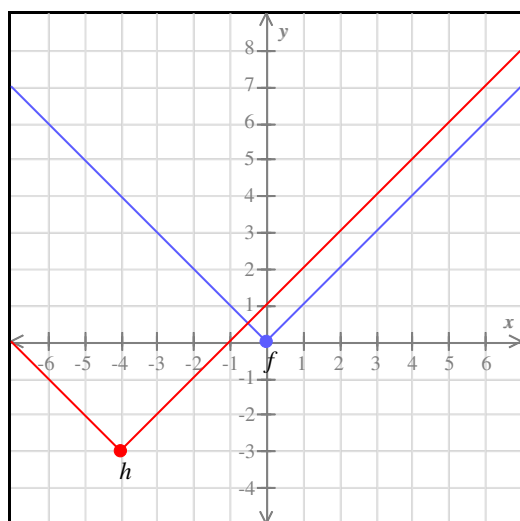
For each graph, select *all* symmetries that apply.

(a)

Symmetry:

☐ *x*-axis

☐ *y*-axis

☐ origin

☐ none of these

(b)

Symmetry:

☐ *x*-axis

☐ *y*-axis

☐ origin

☐ none of these

(c)

Symmetry:

☐ *x*-axis

☐ *y*-axis

☐ origin

☐ none of these

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For each equation, determine whether its graph is symmetric with respect to the *x*-axis, the *y*-axis, and the origin.

Check *all* symmetries that apply.

$$29x^4 + 2y^4 = 49$$

Symmetry:

☐ *x*-axis ☐ *y*-axis ☐ origin

☐ none of the above

$$y = 3 - x^2$$

Symmetry:

☐ *x*-axis ☐ *y*-axis ☐ origin

☐ none of the above

Suppose that the function h is defined, for all real numbers, as follows.

$$h(x) = \begin{cases} -\dfrac{1}{4}x + 2 & \text{if } x \leq -1 \\ -(x+1)^2 & \text{if } -1 < x \leq 2 \\ -3 & \text{if } x > 2 \end{cases}$$

Find $h(1)$, $h(2)$, and $h(5)$.

$h(1)$
$h(2)$
$h(5)$

Determine the interval(s) on which the function is (strictly) decreasing.

Write your answer as an interval or list of intervals.
When writing a list of intervals, make sure to separate each interval with a comma and to use as few intervals as possible.
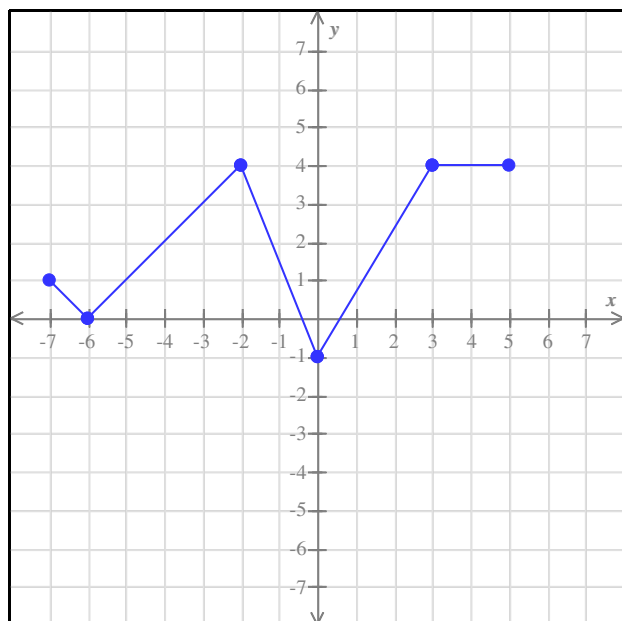
Here is a graph of the function f.
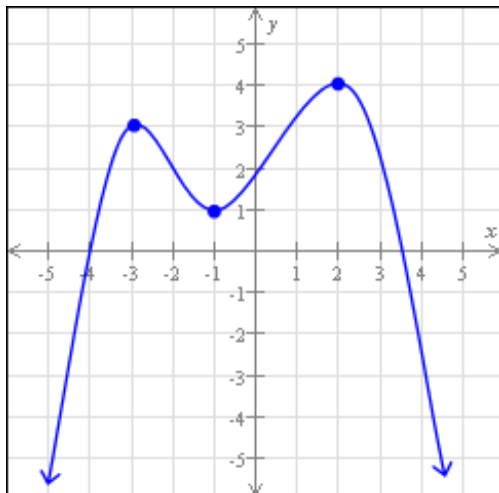
Use the graph to find the following.
If there is more than one answer, separate them with commas.

(a)   All values at which f has a local maximum:

(b)   All local maximum values of f:

Suppose that the function f is defined, for all real numbers, as follows.

$$f(x) = \begin{cases} 4 & \text{if } x \neq 0 \\ -3 & \text{if } x = 0 \end{cases}$$

Graph the function f.
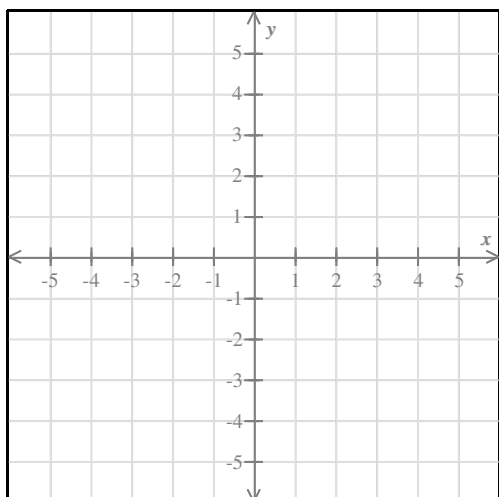
Suppose that the function f is defined, for all real numbers, as follows.

$$f(x) = \begin{cases} -x+3 & \text{if } x < -1 \\ -3x+1 & \text{if } x \geq -1 \end{cases}$$

Graph the function f. Then determine whether or not the function is continuous.
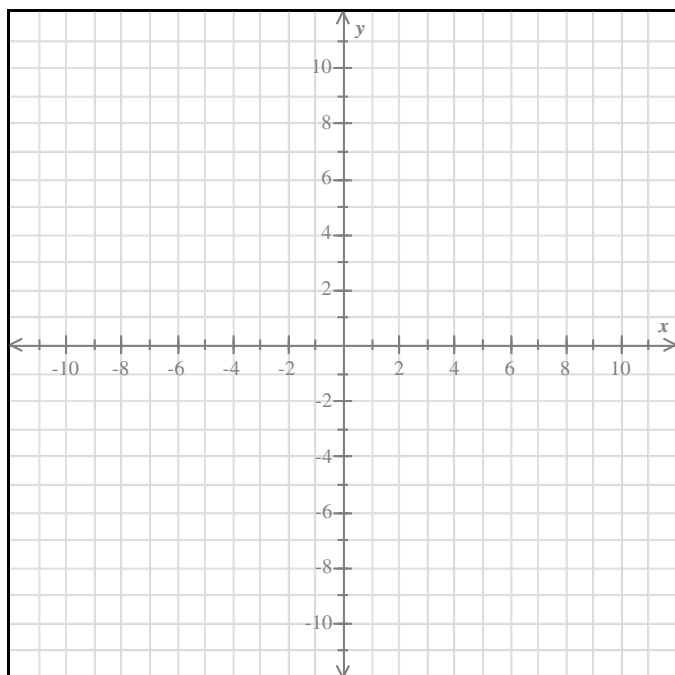
Is the function continuous?

○ Yes

○ No

Suppose that the function f is defined for all real numbers as follows.

$$f(x) = \begin{cases} x^2 + 1 & \text{if} \quad x < 1 \\ 2 & \text{if} \quad x = 1 \\ 7 - 5x & \text{if} \quad x > 1 \end{cases}$$

Graph the function f. Then determine whether or not the function is continuous.
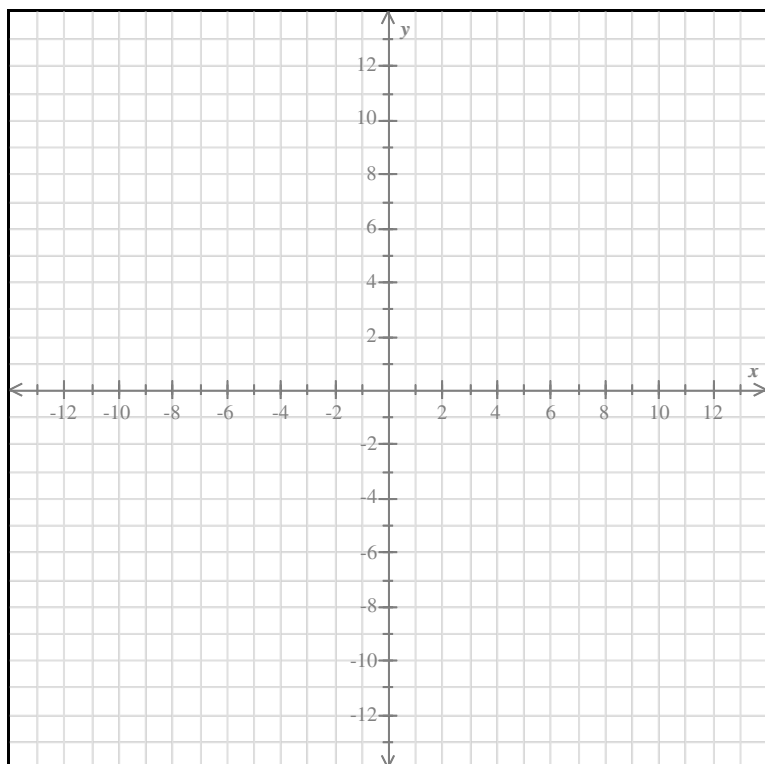
Four functions are given below. Either the function is defined explicitly, or the entire graph of the function is shown.

For each, decide whether it is an even function, an odd function, or neither.

The function r
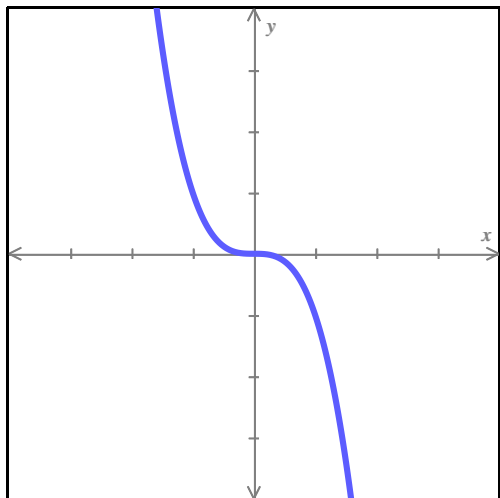
- Even - Odd - Neither

The function s
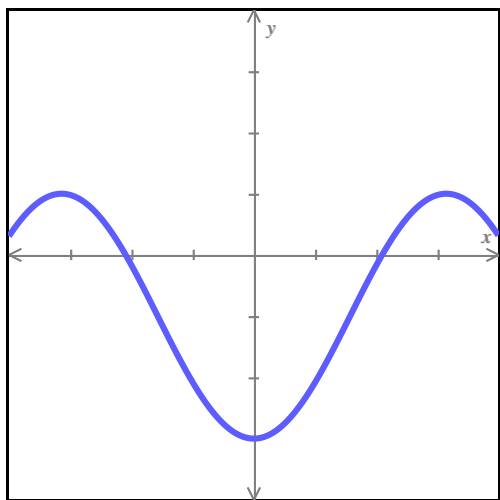
- Even - Odd - Neither

$$g(x) = -6x^5 + 5x^2$$

- Even - Odd - Neither

$$h(x) = -6x^4 + 5x^2$$

- Even - Odd - Neither

Three functions are given below.
For each, decide whether it is an even function, an odd function, or neither.

$f(x) = x^2 \lvert x \rvert + 7$	$g(x) = \dfrac{1}{x+6}$	$h(x) = \sqrt[3]{3x}$
○ Even	○ Even	○ Even
○ Odd	○ Odd	○ Odd
○ Neither	○ Neither	○ Neither

A car rental company's standard charge includes an initial fee plus an additional fee for each mile driven. The standard charge S (in dollars) is given by the function $S = 17.75 + 0.50M$, where M is the number of miles driven.

The company also offers an option to insure the car against damage. The insurance charge I (in dollars) is given by the function $I = 4.90 + 0.15M$.

Let C be the total charge (in dollars) for a rental that includes insurance. Write an equation relating C to M. Simplify your answer as much as possible.

Suppose that the functions f and g are defined for all real numbers x as follows.

$$f(x) = x + 1$$
$$g(x) = 3x + 2$$

Write the expressions for $(f{\cdot}g)(x)$ and $(f - g)(x)$ and evaluate $(f + g)(4)$.

$(f{\cdot}g)(x)$
$(f - g)(x)$
$(f + g)(4)$

Suppose that the functions g and f are defined as follows.

$$g(x) = 2x^2 - 3$$
$$f(x) = 6x - 9$$

(a) Find $\left(\dfrac{g}{f}\right)(-5)$.

(b) Find all values that are NOT in the domain of $\dfrac{g}{f}$.

If there is more than one value, separate them with commas.

Suppose that the functions f and g are defined as follows.

$$f(x) = \frac{2}{x+3} \qquad g(x) = \frac{7}{x}$$

Find $\dfrac{f}{g}$. Then, give its domain using an interval or union of intervals.

Simplify your answers.

Suppose that the functions f and g are defined as follows.

$$f(x) = 3x + 1$$
$$g(x) = \sqrt{x + 2}$$

Find $f{\cdot}g$ and $f - g$. Then, give their domains using interval notation.

$(f{\cdot}g)(x) =$	☐
Domain of $f{\cdot}g$:	☐
$(f - g)(x) =$	☐
Domain of $f - g$:	☐

Suppose that the functions u and w are defined as follows.

$$u(x) = x^2 + 7$$
$$w(x) = \sqrt{x + 8}$$

Find the following.

$$(w \circ u)(1)$$
$$(u \circ w)(1)$$

Suppose that the functions h and f are defined as follows.

$$h(x) = x^2 + 8$$
$$f(x) = \frac{3}{8x}, \ x \neq 0$$

Find the compositions $h \circ h$ and $f \circ f$.

Simplify your answers as much as possible.

(Assume that your expressions are defined for all x in the domain of the composition. You do *not* have to indicate the domain.)

$(h \circ h)(x) = $ _____
$(f \circ f)(x) = $ _____

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For the real-valued functions $g(x) = \dfrac{x+6}{x+3}$ and $h(x) = 2x - 7$, find the composition $g \circ h$ and specify its domain using interval notation.

$(g \circ h)(x) = $

Domain of $g \circ h$:

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The area $A(r)$ (in square meters) of a circular algae colony with radius r meters is given by $A(r) = \pi r^2$.

The radius $M(t)$ (in meters) after t minutes is given by $M(t) = \dfrac{13}{3} t$.

Write a formula for the area $Z(t)$ (in square meters) of the algae colony after t minutes.

It is not necessary to simplify.

$Z(t) = $

Use the graph of the parabola to fill in the table.
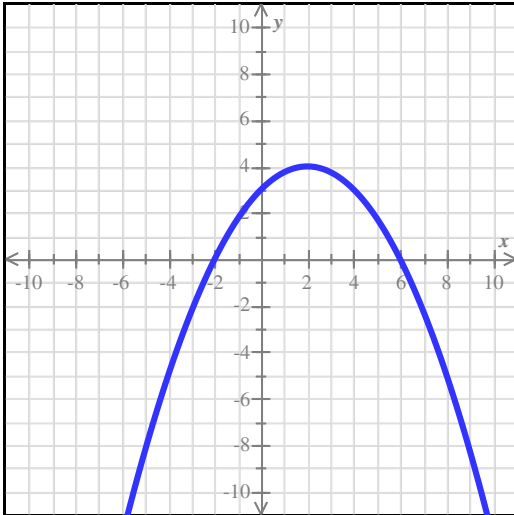
(a) Does the parabola open upward or downward?

  ○ upward   ○ downward

(b) Find the intercept(s).

  x-intercept(s): ☐

  y-intercept(s): ☐

(c) Find the equation of the axis of symmetry.

  equation of axis of symmetry: ☐

(d) Find the coordinates of the vertex.

  vertex: (☐, ☐)

Graph the parabola.

$$y = x^2 - 2x + 6$$
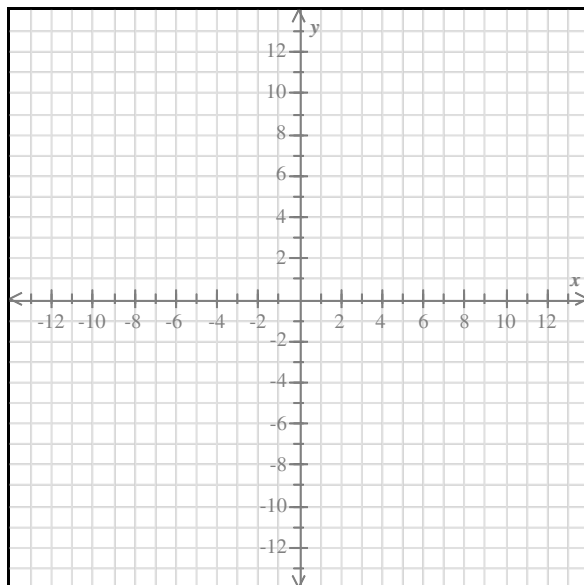
Question 44 of 58

Graph the parabola.

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

Graph the parabola.

$$y = -3x^2 - 12x - 9$$
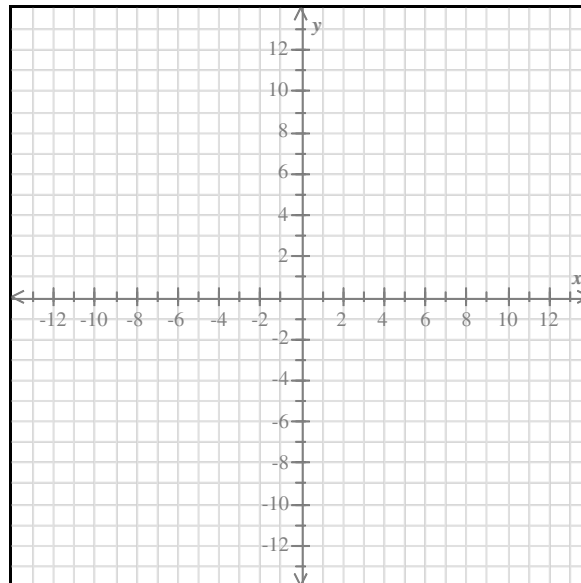
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Find the x-intercept(s) and the coordinates of the vertex for the parabola $y = x^2 + 2x - 8$. If there is more than one x-intercept, separate them with commas.

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Answer the questions below about the quadratic function.

$$g(x) = 2x^2 + 4x + 5$$

Does the function have a minimum or maximum value?
What is the function's minimum or maximum value?
Where does the minimum or maximum value occur? $x =$

An aircraft factory manufactures airplane engines. The unit cost C (the cost in dollars to make each airplane engine) depends on the number of engines made. If x engines are made, then the unit cost is given by the function $C(x) = x^2 - 360x + 37{,}657$. What is the minimum unit cost?

Do not round your answer.

Martina has 160 meters of fencing and wishes to form three sides of a rectangular field. The fourth side borders a river and will not need fencing.

As shown below, one of the sides has length x (in meters).
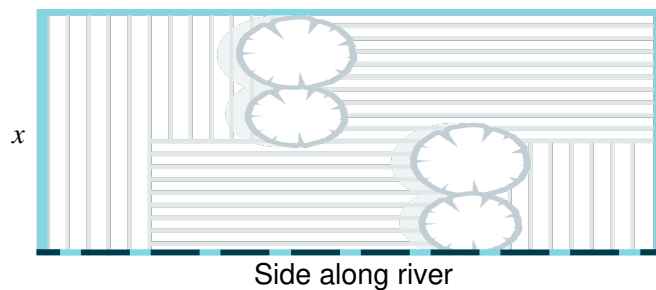
x

Side along river

(a) Find a function that gives the area $A(x)$ of the field (in square meters) in terms of x.

$A(x) = $ ___

(b) What side length x gives the maximum area that the field can have?

Side length x : ___ meters

(c) What is the maximum area that the field can have?

Maximum area: ___ square meters

The graph of a quadratic function with vertex $(-4, -2)$ is shown in the figure below.
Find the domain and the range.
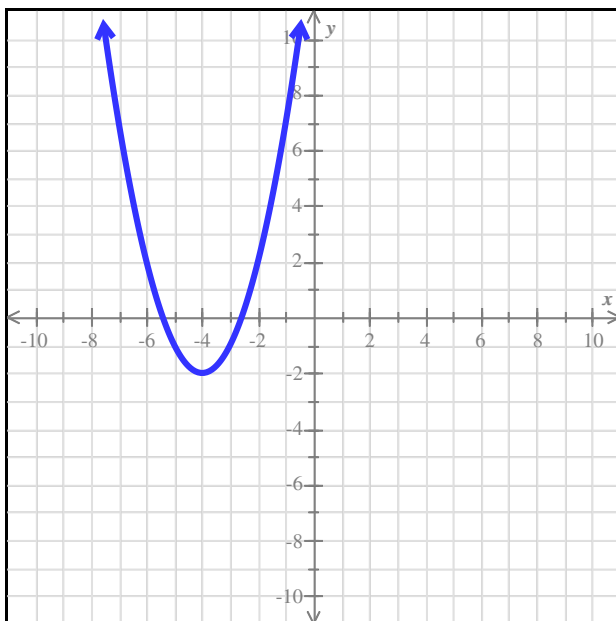
Write the domain and range using interval notation.

$$\text{domain} = \underline{\hspace{2cm}}$$

$$\text{range} = \underline{\hspace{2cm}}$$

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Find the equation of the quadratic function f whose graph is shown below.

Suppose that y varies directly with x, and $y = 15$ when $x = 24$.

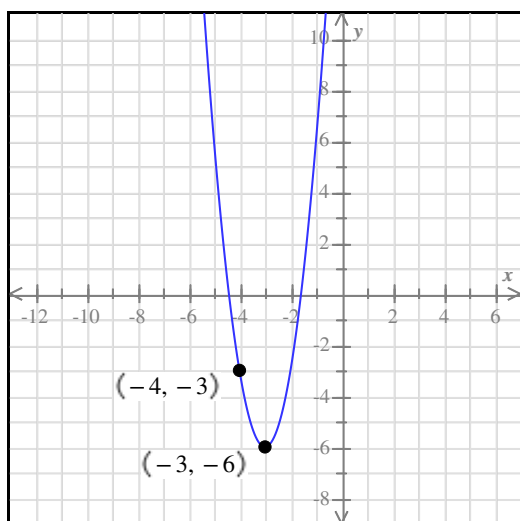| (a) Write a direct variation equation that relates x and y. |
|---|
| Equation: |
| (b) Find y when $x = 3$. |
| $y =$ |

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For a moving object, the force acting on the object varies directly with the object's acceleration. When a force of 30 N acts on a certain object, the acceleration of the object is 10 m/s^2. If the acceleration of the object becomes 8 m/s^2, what is the force?

Lamar is studying. The number of minutes he has studied varies directly with the number of calories he has burned. See the graph below.

Number of minutes
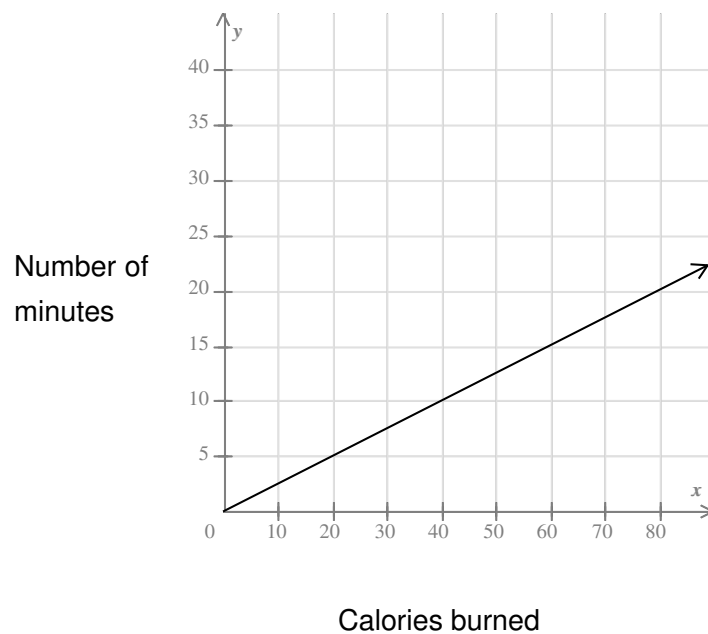
Calories burned

(a) How many calories is Lamar burning per minute?

☐ calorie(s)

(b) What is the slope of the graph?

☐

Question 55 of 58

Suppose that y varies inversely with x, and $y = 4$ when $x = 6$.

(a) Write an inverse variation equation that relates x and y.
Equation:
(b) Find y when $x = 3$.
$y =$

When a constant force is applied to an object, the acceleration of the object varies inversely with its mass. When a certain constant force acts upon an object with mass 5 kg, the acceleration of the object is 6 m/s^2. When the same force acts upon another object, its acceleration is 15 m/s^2. What is the mass of this object?

Write an equation that expresses the following relationship.

w varies jointly with u and d and inversely with p

In your equation, use k as the constant of proportionality.

The volume V of a fixed amount of a gas varies directly as the temperature T and inversely as the pressure P.

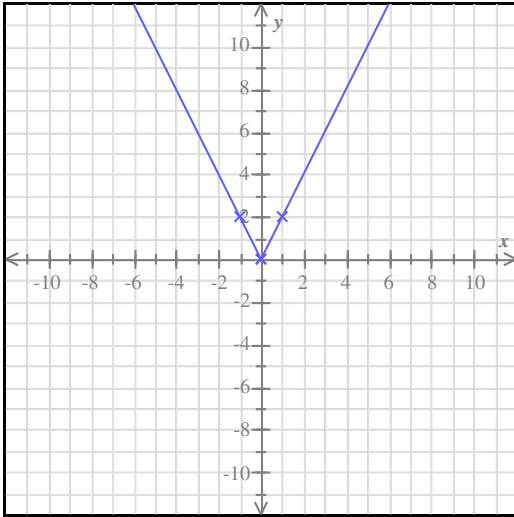Suppose that $V = 70$ cm^3 when $T = 420$ kelvin and $P = 18 \dfrac{\text{kg}}{\text{cm}^2}$. Find the volume when $T = 140$ kelvin and

$P = 7 \dfrac{\text{kg}}{\text{cm}^2}$.

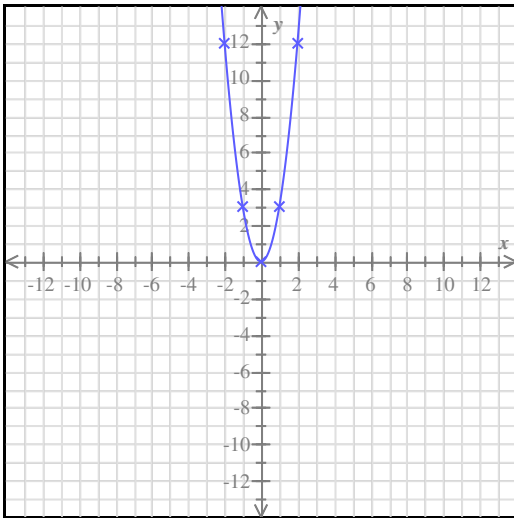$\boxed{}$ cm^3

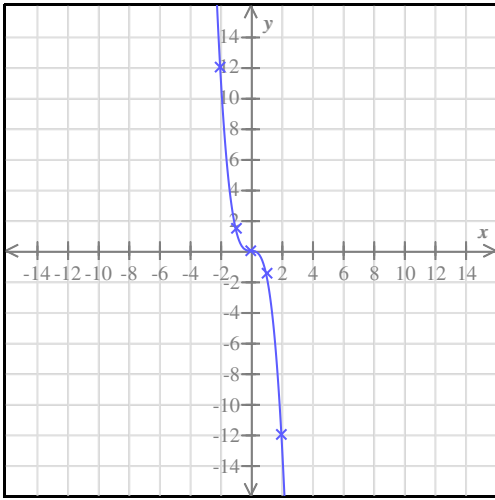# Exam 3 Practice Problems #3 Answers for class Lacoste College Algebra Spring 2020 - CRN22385 MW3

Question 1 of 58
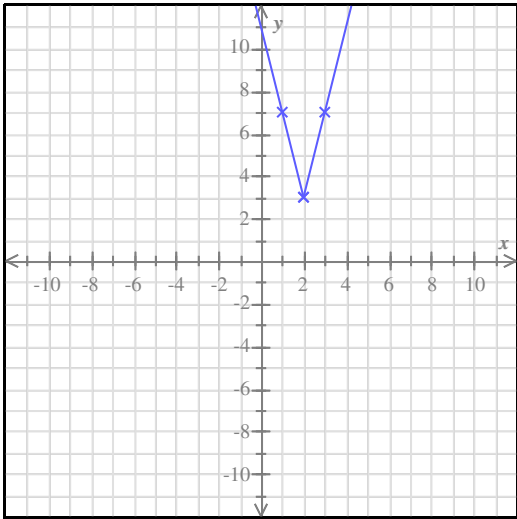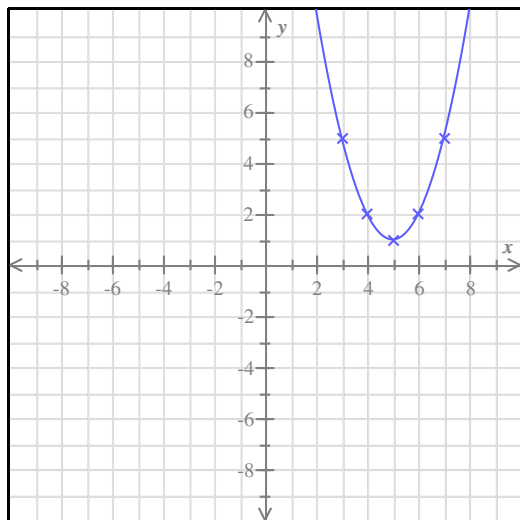

Question 2 of 58

Question 3 of 58

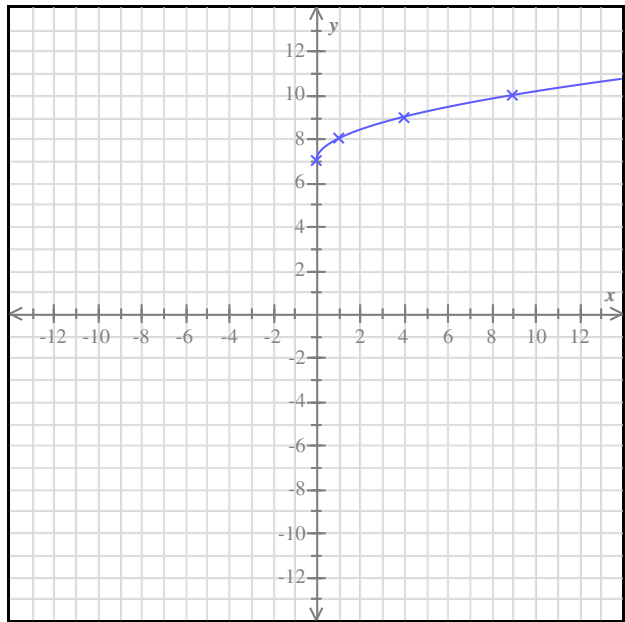**Question 4 of 58**
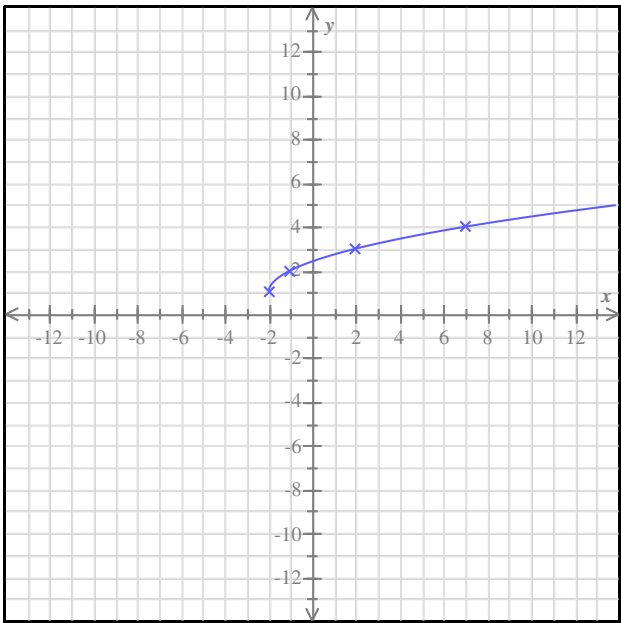
$$f(-64) = -5$$

$$f(27) = 2$$

Question 5 of 58

Question 6 of 58
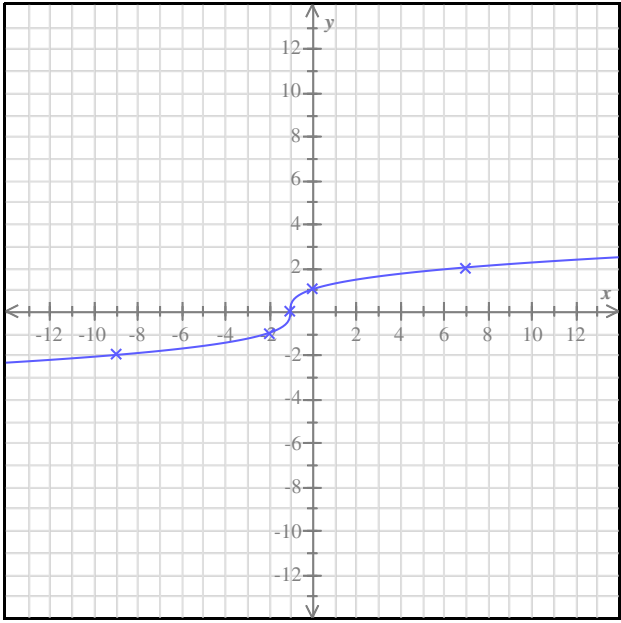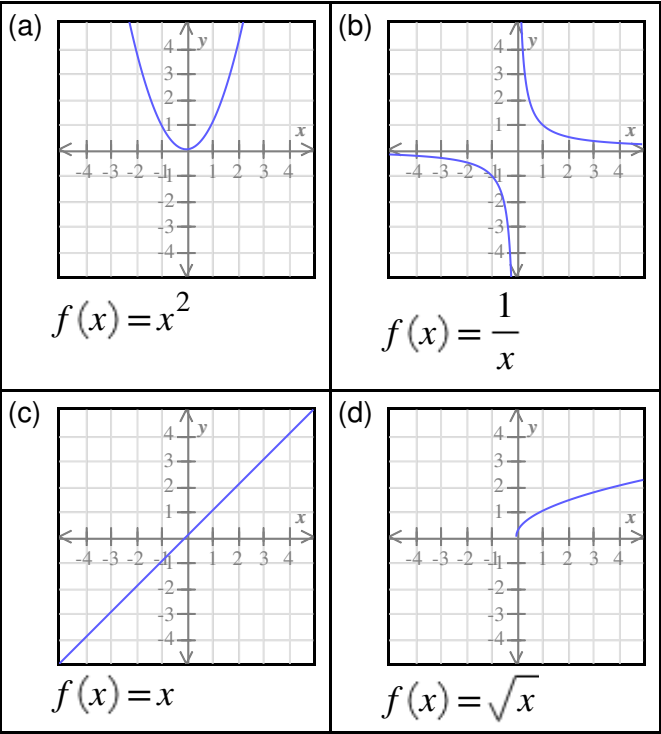
Question 7 of 58

Question 8 of 58

Question 9 of 58

Question 10 of 58

(a)

$$f(x) = x^2$$

(b)

$$f(x) = \frac{1}{x}$$

(c)

$$f(x) = x$$

(d)

$$f(x) = \sqrt{x}$$

Question 11 of 58

	A	*B*	*C*	*D*
(a) For each coefficient, choose whether it is positive or negative.	Positive ▾	Positive ▾	Negative ▾	Negative ▾
(b) Choose the coefficient closest to 0.	○	○	◉	○
(c) Choose the coefficient with the least value.	○	○	○	◉

Question 12 of 58

Part (a)

Part (b)
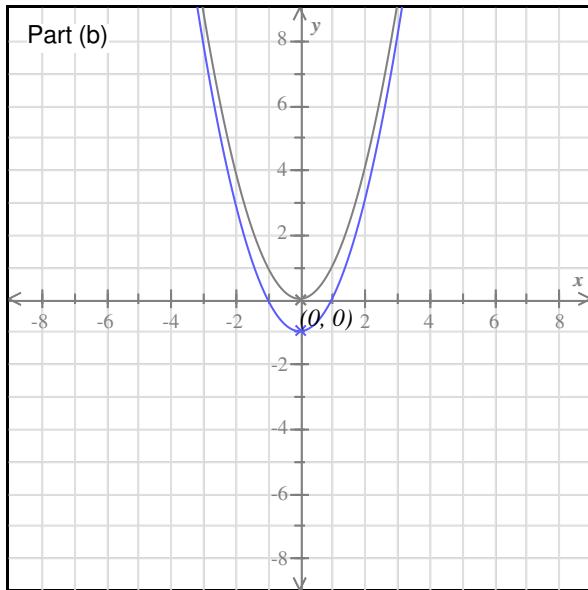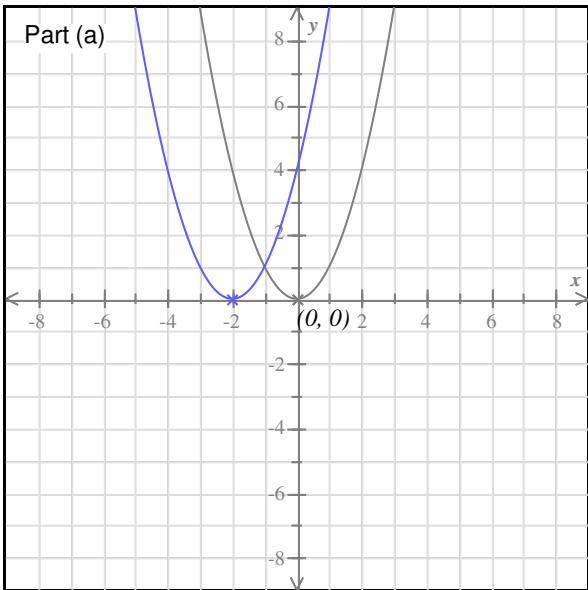
Question 13 of 58

Question 14 of 58

Part (a)

y

8
6
4
2

-8 -6 -4 -2 (0, 0) 2 4 6 8 x

-2
-4
-6
-8

Part (b)

y

8
6
4
2

-8 -6 -4 -2 (0, 0) 2 4 6 8 x

-2
-4
-6
-8

Question 15 of 58

y

8
6
4
2

-8 -6 -4 -2 (0, 0) 2 4 6 8 x
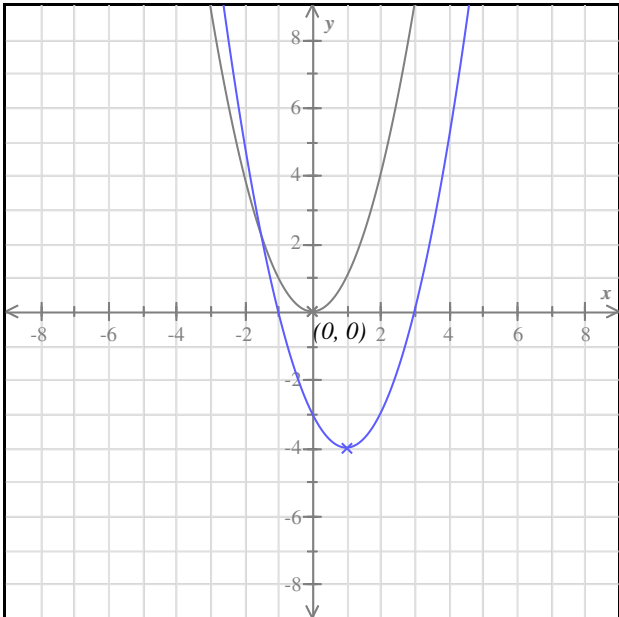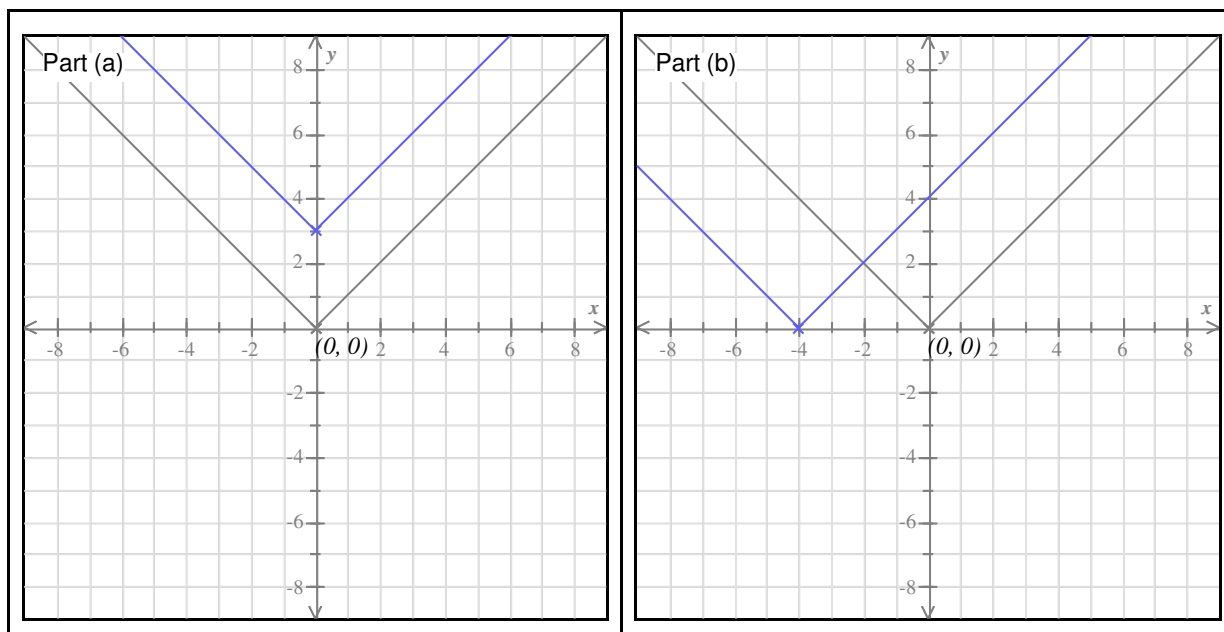
-2
-4
-6
-8
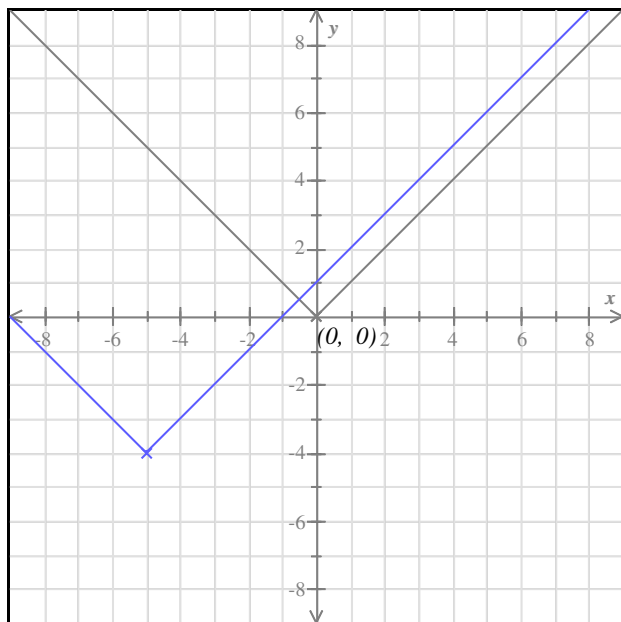
Question 16 of 58

$$g(x) = 4x^2 + 6$$

Question 17 of 58

Part (a)

(0, 0)

Part (b)

(-2, -1)

Question 18 of 58

(0, 0)
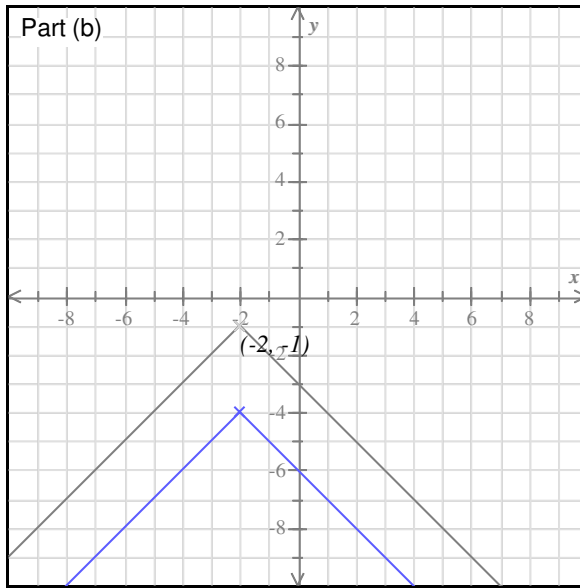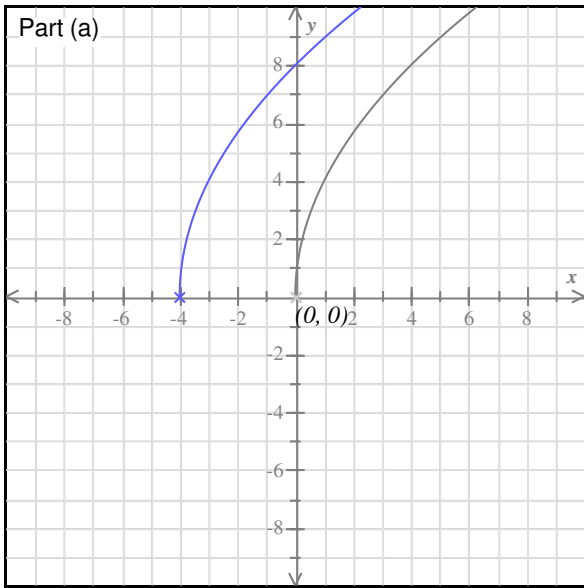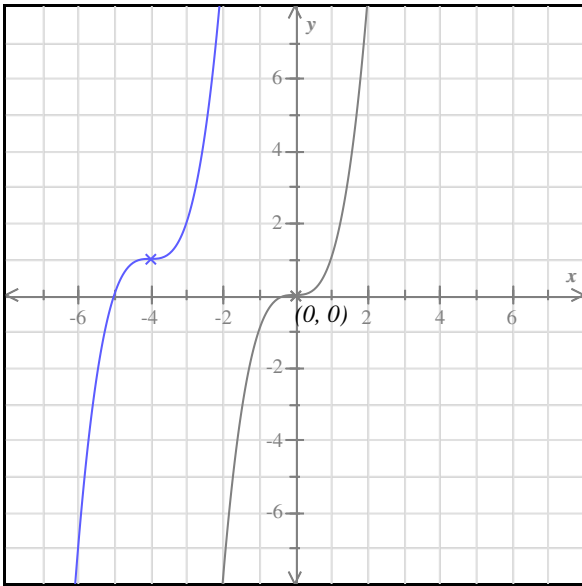
Question 19 of 58

The graph of $y = f(x)$ is shown. Graph $y = \dfrac{1}{2} f(x)$.

The graph of $y = g(x)$ is shown. Graph $y = g\left(\dfrac{1}{2} x\right)$.

Question 20 of 58

The graph of $y = g(x)$ is shown. Draw the graph of $y = 2g(x) + 4$.
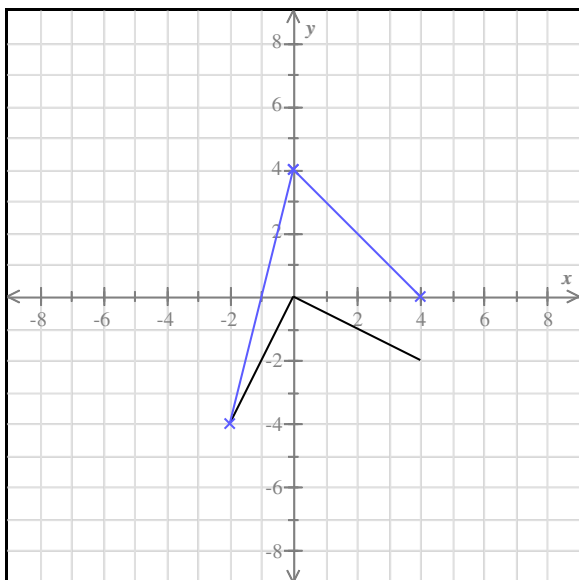
The graph of $y = h(x)$ is shown. Draw the graph of $y = -h(x-2)$.

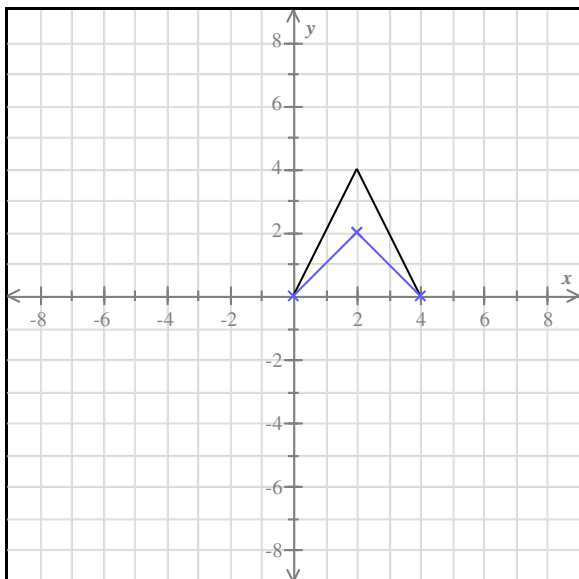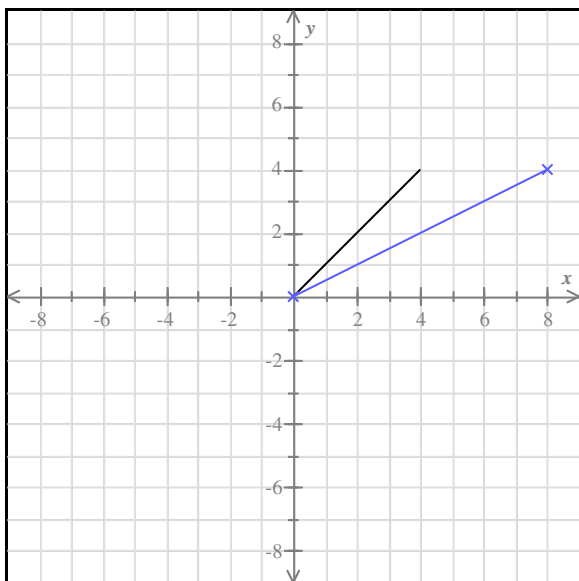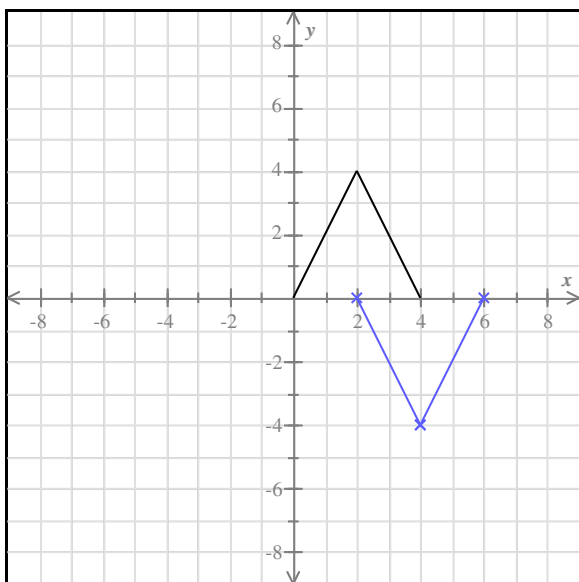**Question 21 of 58**
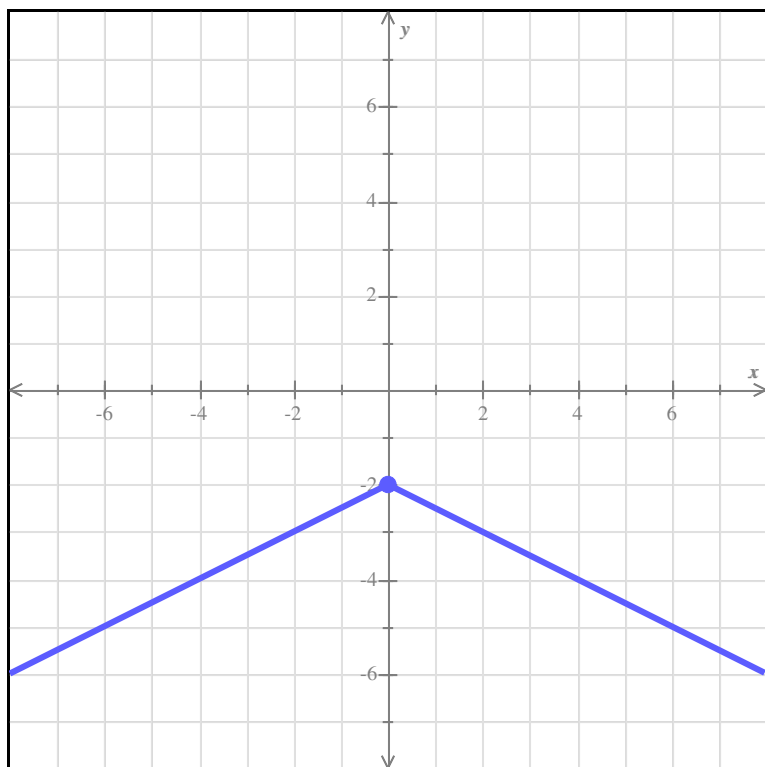
Question 22 of 58

$$h(x) = |x+4| - 3$$

Question 23 of 58

(a)

Symmetry:

☑ x-axis
☑ y-axis
☑ origin
☐ none of these

(b)

Symmetry:

☐ x-axis
☑ y-axis
☐ origin
☐ none of these

(c)

Symmetry:

☐ x-axis
☐ y-axis
☑ origin
☐ none of these

Question 24 of 58

$29x^4 + 2y^4 = 49$	$y = 3 - x^2$
Symmetry:	Symmetry:
☑ x-axis ☑ y-axis ☑ origin	☐ x-axis ☑ y-axis ☐ origin
☐ none of the above	☐ none of the above

Question 25 of 58

$h(1) = -4$
$h(2) = -9$
$h(5) = -3$

Question 26 of 58

$(-7, -6), (-2, 0)$

Question 27 of 58

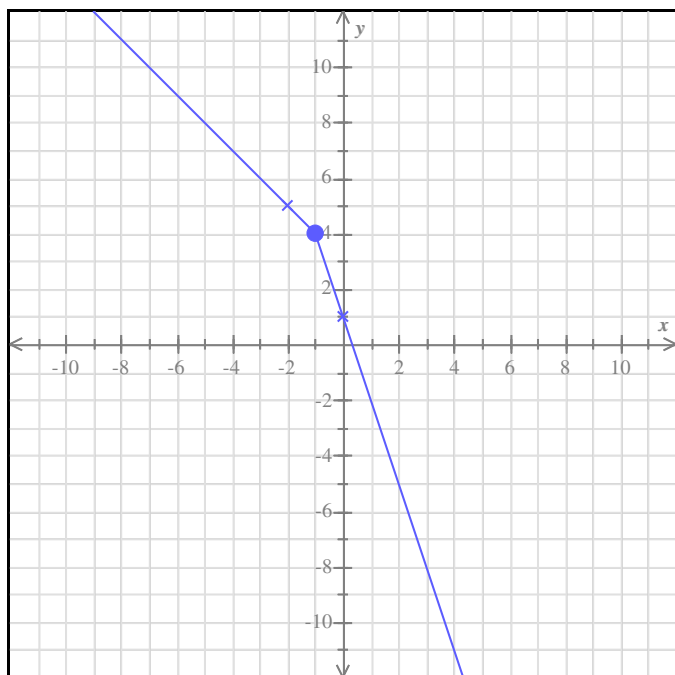(a) All values at which f has a local maximum: -3 , 2
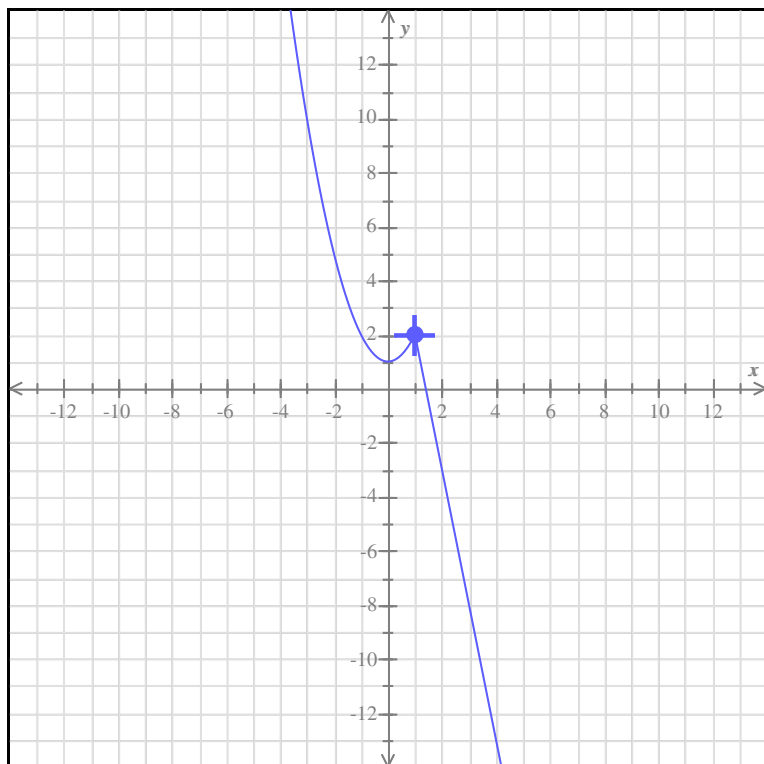
(b) All local maximum values of f: 3 , 4
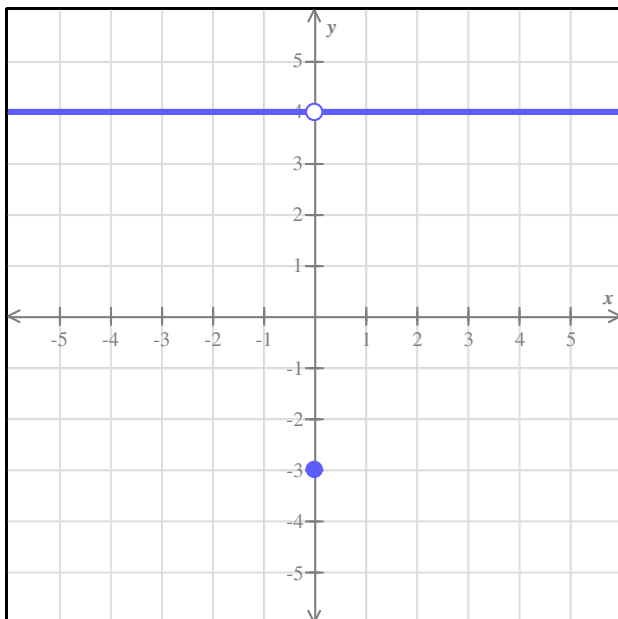
Question 28 of 58

Is the function continuous?

◉ Yes

○ No

Question 30 of 58

Is the function f continuous? ◉ Yes ○ No
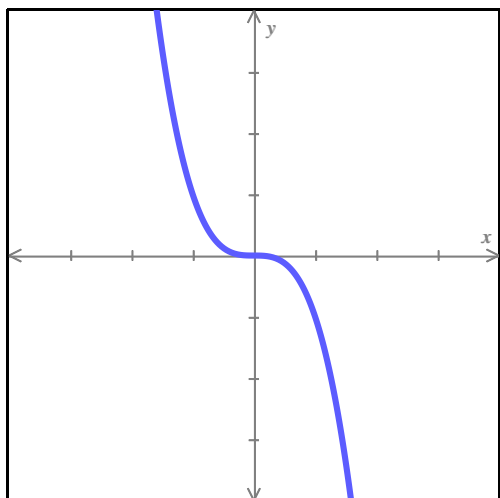
The function r

- Odd

The function s
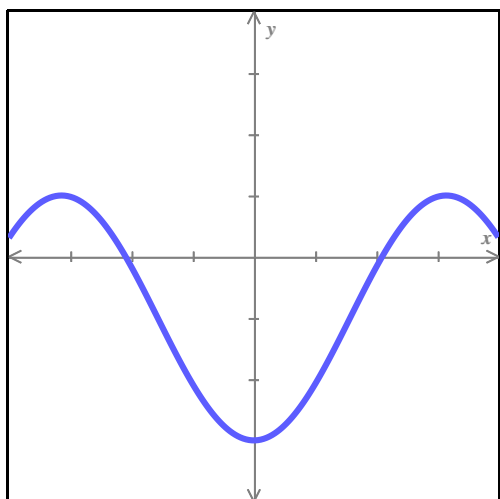
- Even

$$g\left(x\right) = -6x^5 + 5x^2$$

- Neither

$$h\left(x\right) = -6x^4 + 5x^2$$

- Even

Question 32 of 58

$f(x) = x^2\|x\| + 7$	$g(x) = \dfrac{1}{x+6}$	$h(x) = \sqrt[3]{3x}$
⊙ Even	○ Even	○ Even
○ Odd	○ Odd	⊙ Odd
○ Neither	⊙ Neither	○ Neither

Question 33 of 58

$C = 22.65 + 0.65M$

Question 34 of 58

$(f \cdot g)(x) = 3x^2 + 5x + 2$
$(f - g)(x) = -2x - 1$
$(f + g)(4) = 19$

Question 35 of 58

(a) $\left(\dfrac{g}{f}\right)(-5) = -\dfrac{47}{39}$

(b) Value(s) that are NOT in the domain of $\dfrac{g}{f}$: $\dfrac{3}{2}$

Question 36 of 58

$\left(\dfrac{f}{g}\right)(x) = \dfrac{2x}{7(x+3)}$

Domain of $\dfrac{f}{g}$: $(-\infty, -3) \cup (-3, 0) \cup (0, \infty)$

Question 37 of 58

$$(f \cdot g)(x) = (3x + 1)\sqrt{x + 2}$$

Domain of $f \cdot g$: $[-2, \infty)$

$$(f - g)(x) = 3x + 1 - \sqrt{x + 2}$$

Domain of $f - g$: $[-2, \infty)$

Question 38 of 58

$$(w \circ u)(1) = 4$$
$$(u \circ w)(1) = 16$$

Question 39 of 58

$$(h \circ h)(x) = x^4 + 16x^2 + 72$$
$$(f \circ f)(x) = x$$

Question 40 of 58

$$(g \circ h)(x) = \frac{2x - 1}{2x - 4}$$

Domain of $g \circ h$: $(-\infty, 2) \cup (2, \infty)$

Question 41 of 58

$$Z(t) = \pi \left(\frac{13}{3} t \right)^2$$

Question 42 of 58

(a) Does the parabola open upward or downward?

○ upward   ⦿ downward

(b) Find the intercept(s).
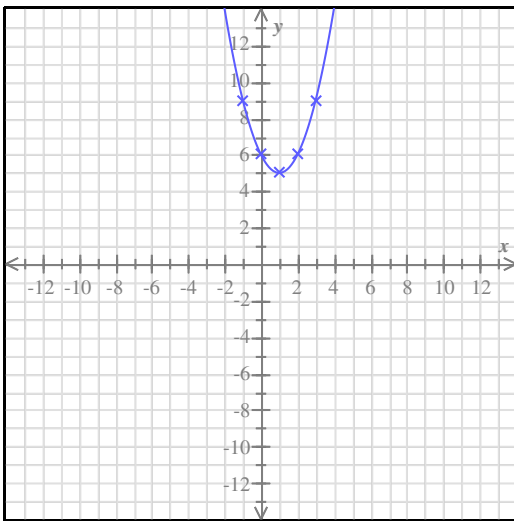
x-intercept(s): $-2, 6$

y-intercept(s): 3

(c) Find the equation of the axis of symmetry.

equation of axis of symmetry: $x = 2$

(d) Find the coordinates of the vertex.

vertex: $\left(2, 4\right)$

Question 43 of 58

Question 44 of 58
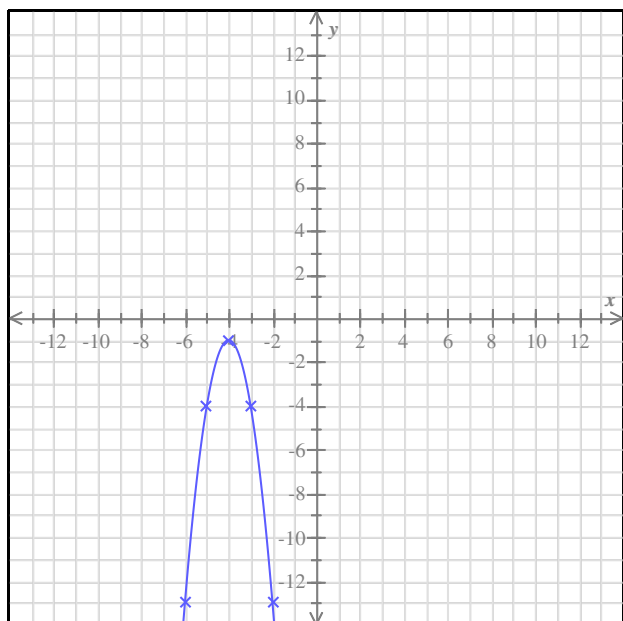
Question 45 of 58
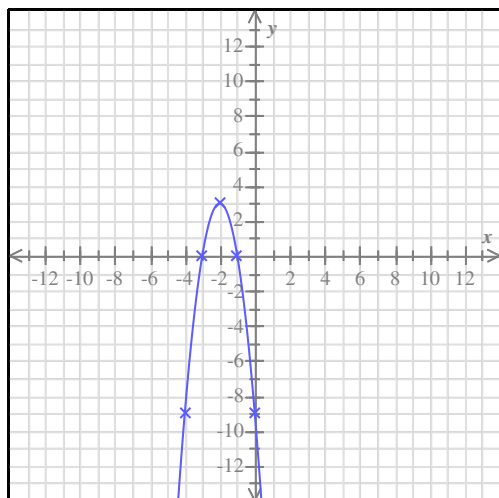
Question 46 of 58

x-intercept(s): $-4 \, , \, 2$

vertex: $\left(-1, \, -9 \right)$

Question 47 of 58

Does the function have a minimum or maximum value? minimum
What is the function's minimum or maximum value? 3
Where does the minimum or maximum value occur? $x = -1$

Unit cost: $5257

(a) Find a function that gives the area $A(x)$ of the field (in square meters) in terms of x.

$$A(x) = 160x - 2x^2$$

(b) What side length x gives the maximum area that the field can have?

Side length x : 40 meters

(c) What is the maximum area that the field can have?

Maximum area: 3,200 square meters

domain: $(-\infty, \infty)$

range: $[-2, \infty)$

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

(a) Write a direct variation equation that relates x and y.

Equation: $y = \dfrac{5}{8}x$

(b) Find y when $x = 3$.

$$y = \dfrac{15}{8}$$

Question 53 of 58

24 N

Question 54 of 58

(a) How many calories is Lamar burning per minute?

4 calorie(s)

(b) What is the slope of the graph?

$$\frac{1}{4}$$

Question 55 of 58

(a) Write an inverse variation equation that relates x and y.
Equation: $y = \dfrac{24}{x}$
(b) Find y when $x = 3$.
$y = 8$

Question 56 of 58

2 kg

Question 57 of 58

$$w = \frac{k u d}{p}$$

Question 58 of 58

The volume is 60 cm^3.