1. Classify the following statement as either true or false.

   The graph of a quadratic function may be a straight line or a parabola.

   Choose the correct answer below.

   - **A.** True, because a quadratic function can be regarded as a linear function.
   - **B.** False, because the graph of any quadratic function is a parabola.
   - **C.** False, because the graph of any quadratic function is a straight line.
   - **D.** True, because the last two terms of any quadratic function form the linear function.

2. Classify the following statement as either true or false.

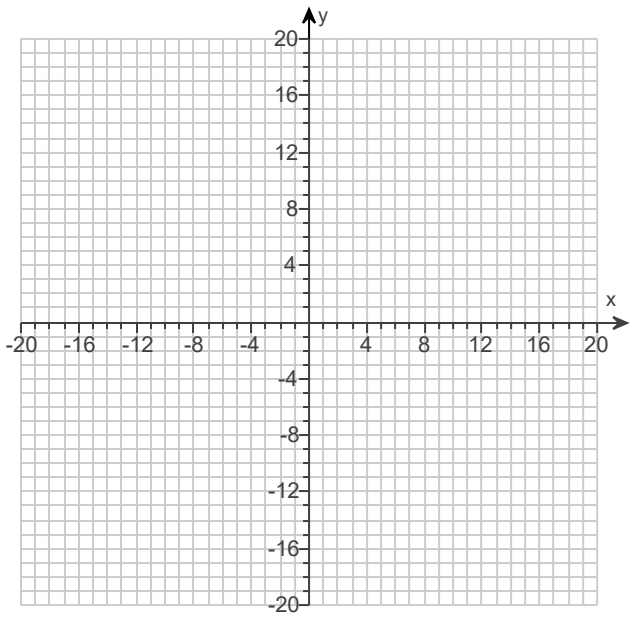
   Every quadratic function has either a maximum value or a minimum value.

   Choose the correct answer below.

   - **A.** False, because a quadratic function does not have a minimum value.
   - **B.** True, because the graph of a quadratic function is a curve that is either increasing or decreasing.
   - **C.** False, because a quadratic function does not have a maximum value.
   - **D.** True, because the graph of a quadratic function is a parabola that either opens upward or downward.

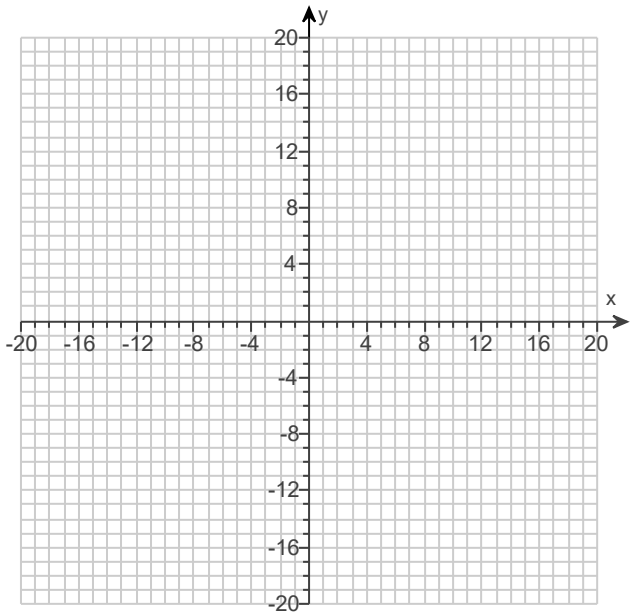
3. Graph $f(x) = 17x^2$.

   Use the graphing tool to graph the function.



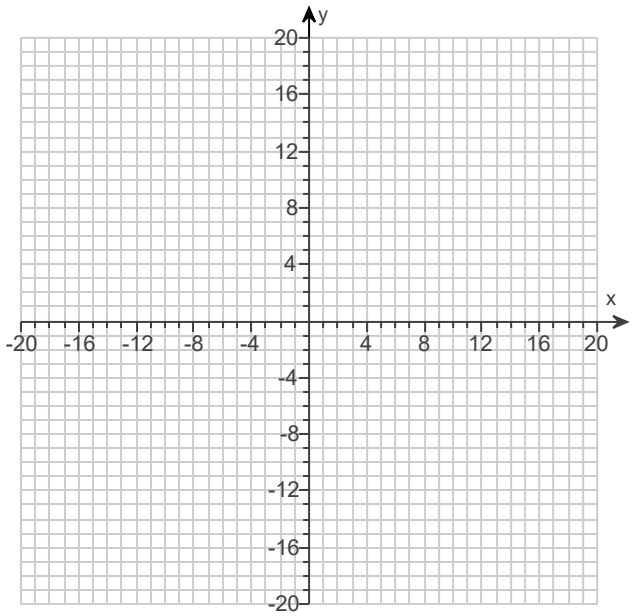
4. Graph $f(x) = -16x^2$.

Use the graphing tool to graph the function.



5. Graph $f(x) = \frac{1}{7}x^2$.

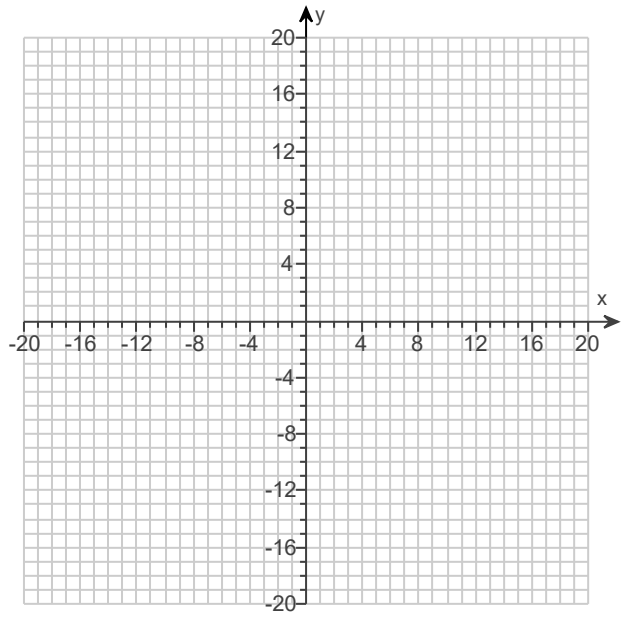
Use the graphing tool to graph the function.



6. Graph the following function using the vertex and axis of symmetry.

$f(x) = (x + 11)^2$

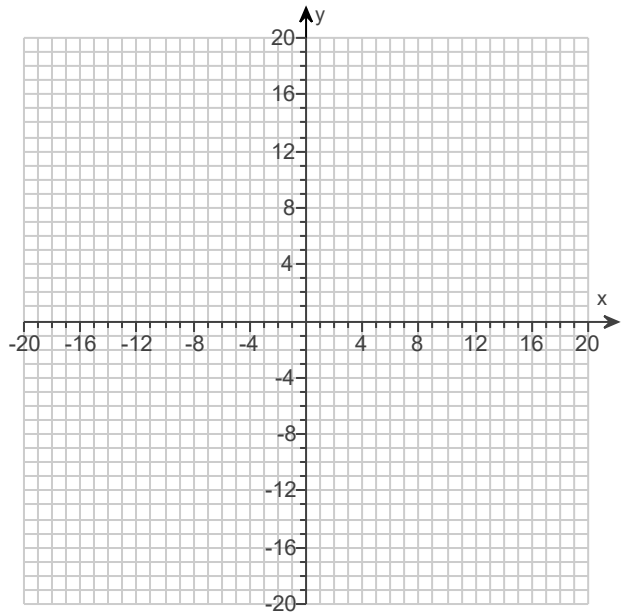
Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



7. Graph the following function using the vertex and axis of symmetry.

$f(x) = (x - 1)^2$

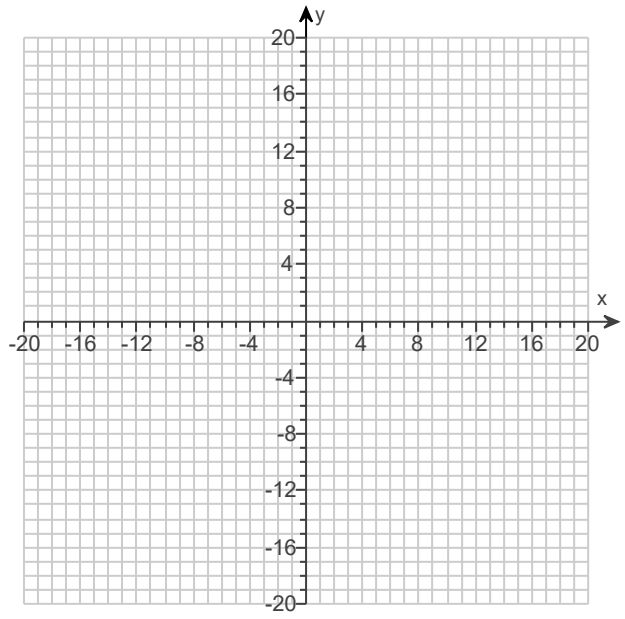
Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



8. Graph the following function using the vertex and axis of symmetry.

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

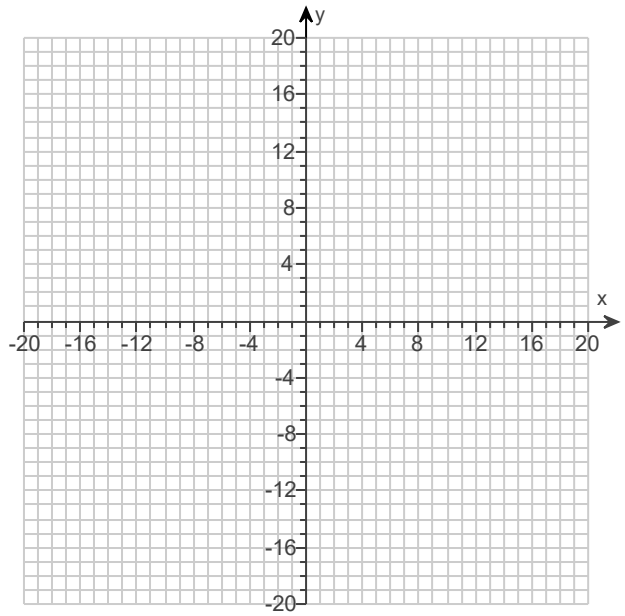
Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



9. Graph the following function using the vertex and axis of symmetry.

$f(x) = -(x - 13)^2$

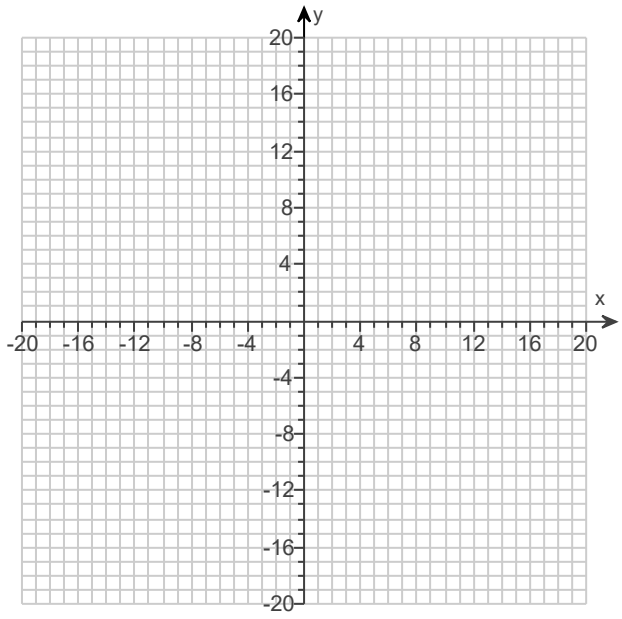
Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



10. Graph the following function using the vertex and axis of symmetry.

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

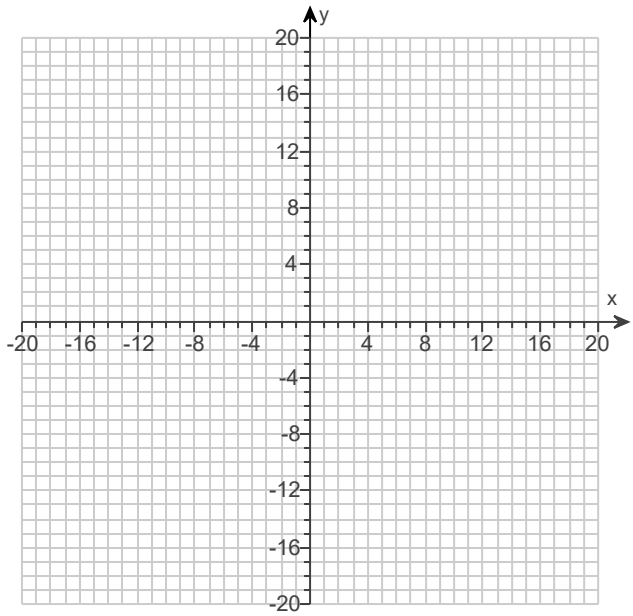
Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



11. Graph the following function using the vertex and axis of symmetry.

$f(x) = -\frac{1}{4}(x - 6)^2$

Use the graphing tool to graph the function as a solid curve and the axis of symmetry as a dashed line.



12. Graph the following function and find the vertex, the axis of symmetry, and the maximum value or the minimum value.

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

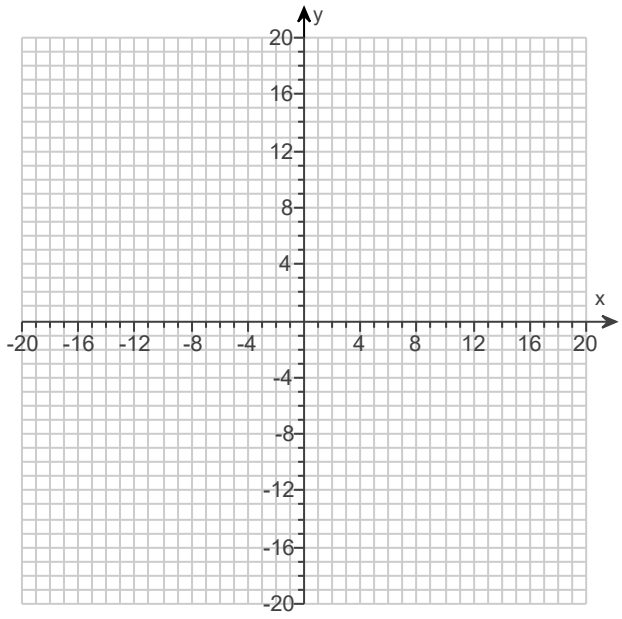
The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Determine the maximum value or the minimum value. Select the correct choice below and fill in the answer box to complete your choice.

- **A.** There is a minimum value of _____.
- **B.** There is a maximum value of _____.

Use the graphing tool to graph the function.



13. Graph the following function and find the vertex, the axis of symmetry, and the maximum value or the minimum value.

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

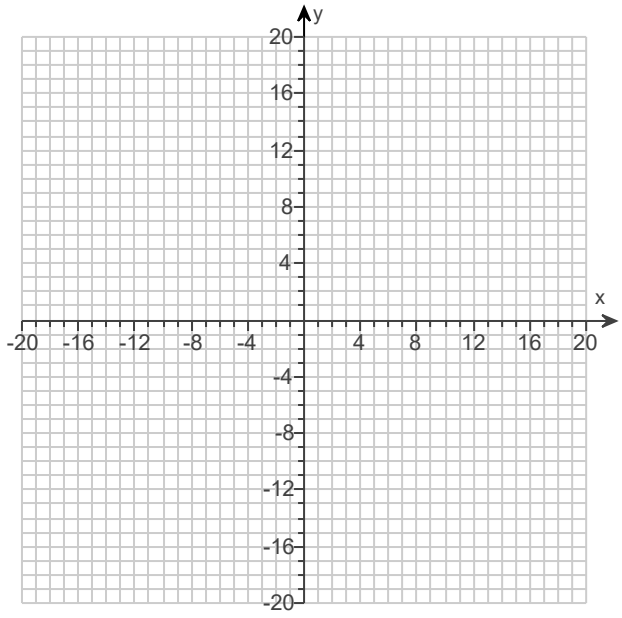
The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Determine the maximum value or the minimum value. Select the correct choice below and fill in the answer box to complete your choice.

- **A.** There is a minimum value of _____.
- **B.** There is a maximum value of _____.

Use the graphing tool to graph the function.



14. Graph the following function and find the vertex, the axis of symmetry, and the maximum value or the minimum value.

$f(x) = \frac{1}{2}(x+4)^2 + 2$

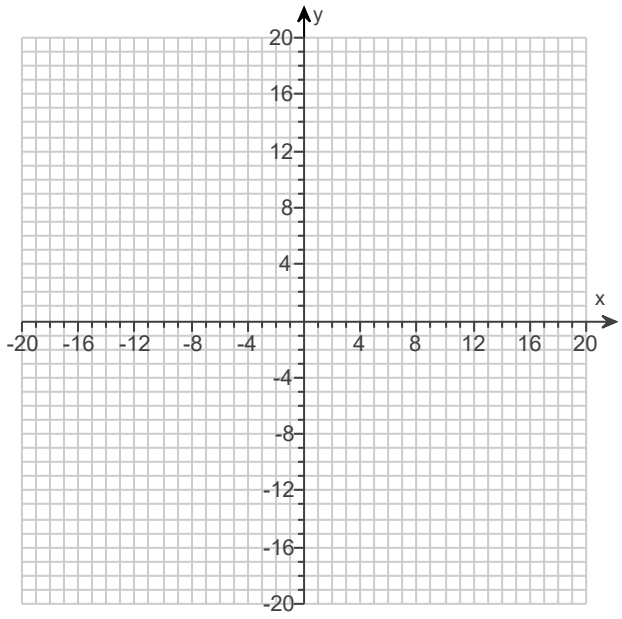
The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Determine the maximum value or the minimum value.
Select the correct choice below and fill in the answer box to complete your choice.

- **A.** There is a minimum value of _____.
- **B.** There is a maximum value of _____.

Use the graphing tool to graph the function.



15. Graph the following function and find the vertex, the axis of symmetry, and the maximum value or the minimum value.

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

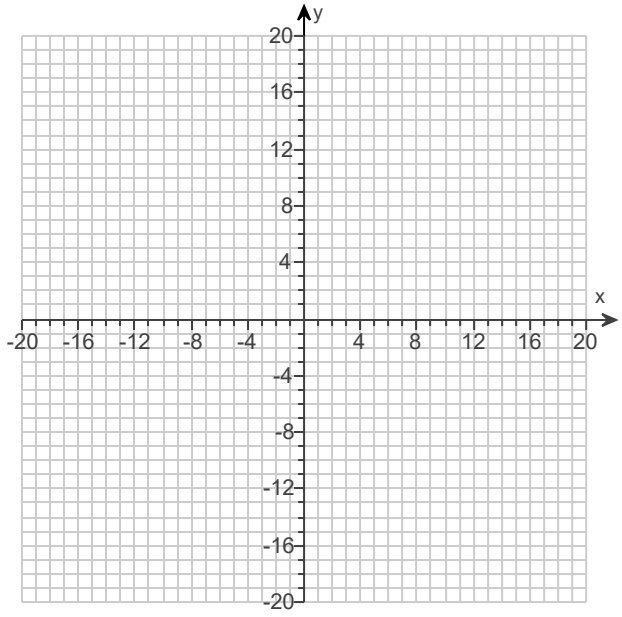
The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Determine the maximum value or the minimum value.
Select the correct choice below and fill in the answer box to complete your choice.

- **A.** There is a minimum value of _____.
- **B.** There is a maximum value of _____.

Use the graphing tool to graph the function.



16. Without graphing, find the vertex and the maximum or minimum value of f(x).

$f(x) = 5(x-6)^2 + 8$

What is the vertex? _____
(Type an ordered pair.)

Is there a maximum or minimum value of f(x)?

- ○ minimum
- ○ maximum

What is the minimum value of f(x)? _____

17. Classify the following statement as either true or false.

The graph of $f(x) = 3x^2 - 6x + 9$ opens upward.

Select the correct choice below and fill in the answer box to complete your choice.

- ○ **A.** False because the coefficient of the leading term is _____, which is negative.
- ○ **B.** True because the coefficient of the leading term is _____, which is positive.

18. Classify the following statement as either true or false.

The graph of $f(x) = -3(x-1)^2 + 5$ has its vertex at (1,5).

Choose the correct answer below.

- ○ **A.** True because h = 5 and k = 1.
- ○ **B.** False because h = 1 and k = 3.
- ○ **C.** False because h = 3 and k = 5.
- ○ **D.** True because h = 1 and k = 5.

19. Classify the following statement as either true or false.

The graph of $f(x) = \frac{1}{4}\left(x - \frac{5}{3}\right)^2 + \frac{1}{2}$ has $x = \frac{1}{2}$ as its axis of symmetry.

Choose the correct answer below.

- ○ **A.** False because $h = \frac{5}{3}$.
- ○ **B.** True because $k = \frac{5}{3}$.
- ○ **C.** False because $k = \frac{5}{3}$.
- ○ **D.** True because $h = \frac{5}{3}$.

20. Classify the following statement as either true or false.

The y-intercept of the graph of $f(x) = 3x^2 - 4x + 6$ is (0,6).

Choose the correct answer below.

- **A.** True, because for $f(x) = ax^2 + bx + c$, the y-intercept is (0,c).
- **B.** False, because for $f(x) = ax^2 + bx + c$, the y-intercept is (c,0).
- **C.** False, because for $f(x) = ax^2 + bx + c$, the y-intercept is (a,0).
- **D.** True, because for $f(x) = ax^2 + bx + c$, the y-intercept is (0,a).

---

21. Write the quadratic function in the form $a(x - h)^2 + k$.

$f(x) = x^2 - 10x + 26$

Which of these represents f(x) in the form $a(x - h)^2 + k$?

- **A.** $(x - 10)^2 - 74$
- **B.** $(x - 5)^2 + 26$
- **C.** $(x + 5)^2 + 1$
- **D.** $(x - 5)^2 + 1$

---

22. Complete the square to write the function given below in the form $f(x) = a(x - h)^2 + k$.

$f(x) = x^2 + 5x - 3$

Substitute the missing values.

$f(x) = \left(x - \left(\_\_\_\_\_\right)\right)^2 + \left(\_\_\_\_\_\right)$

(Use integers or fractions for any numbers in the expression.)

---

23. Complete the square to write the function given below in the form $f(x) = a(x - h)^2 + k$.

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

Substitute the missing values.

$f(x) = 3\left(x - \left(\_\_\_\_\_\right)\right)^2 + \left(\_\_\_\_\_\right)$

---

24. Complete the square to write the function given below in the form $f(x) = a(x - h)^2 + k$.

$f(x) = -x^2 - 6x - 14$

$f(x) = \_\_\_\_\_\left(x - \left(\_\_\_\_\_\right)\right)^2 + \left(\_\_\_\_\_\right)$

(Type integers or simplified fractions.)

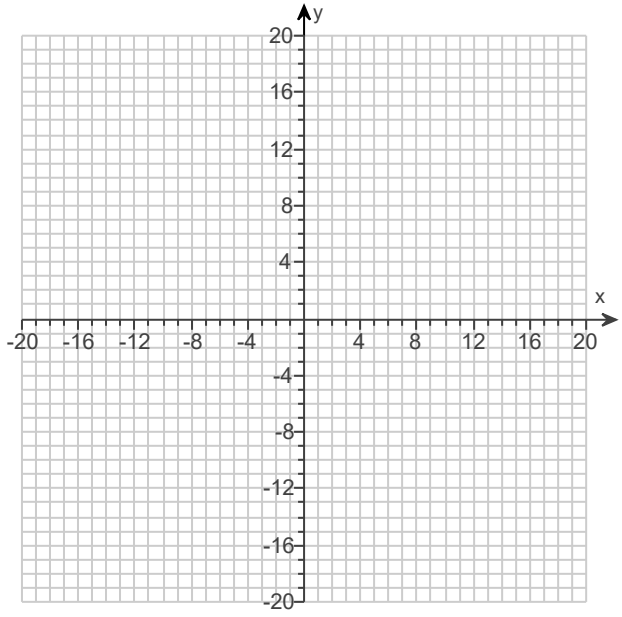
---

25. For the quadratic function $f(x) = x^2 + 4x - 7$, **(a)** find the vertex and the axis of symmetry and **(b)** graph the function.

(a) The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

(b) Use the graphing tool to graph the function.

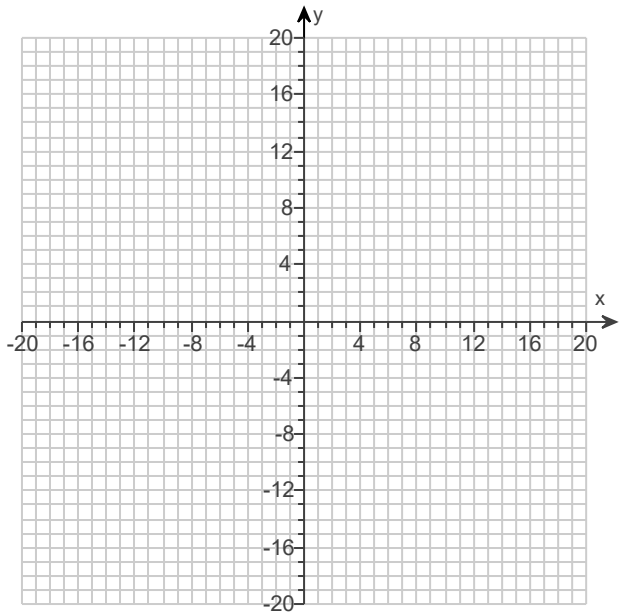


26. For the quadratic function $f(x) = 2x^2 - 12x + 12$, **(a)** find the vertex and the axis of symmetry, and **(b)** graph the function.

(a) The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

(b) Use the graphing tool to graph the function.

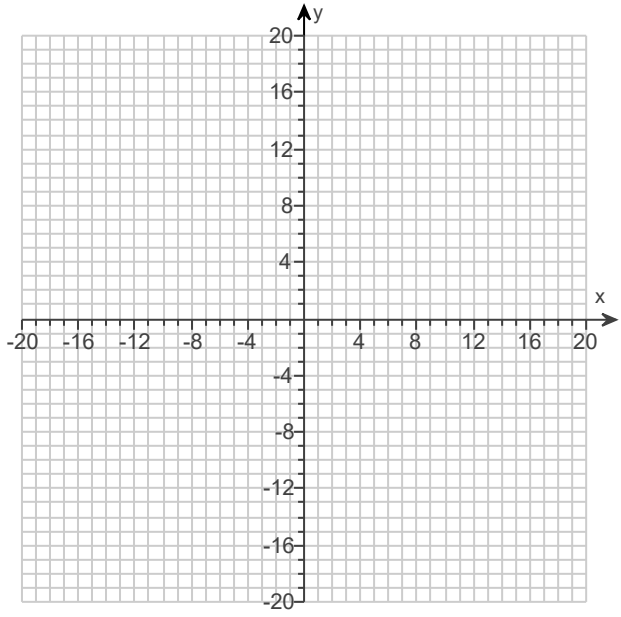


27. For the quadratic function $f(x) = -x^2 + 6x + 7$, **(a)** find the vertex and the axis of symmetry, and **(b)** graph the function.

(a) The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

(b) Use the graphing tool to graph the function.



28. Find the vertex and the axis of symmetry, and graph the function.

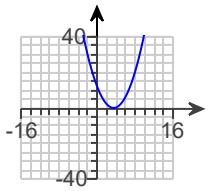
$f(x) = x^2 - 7x$

The vertex is _____.
(Type an ordered pair. Type improper fractions.)

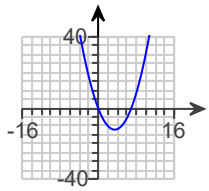
What is the axis of symmetry?
$x =$ _____

Choose the correct graph on the right.

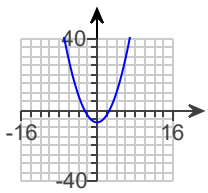
A.



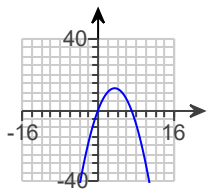
B.



C.



D.



29. For the quadratic function $g(x) = x^2 - 8x + 18$, **(a)** find the vertex, the axis of symmetry, and the maximum or minimum function value, and **(b)** graph the function.

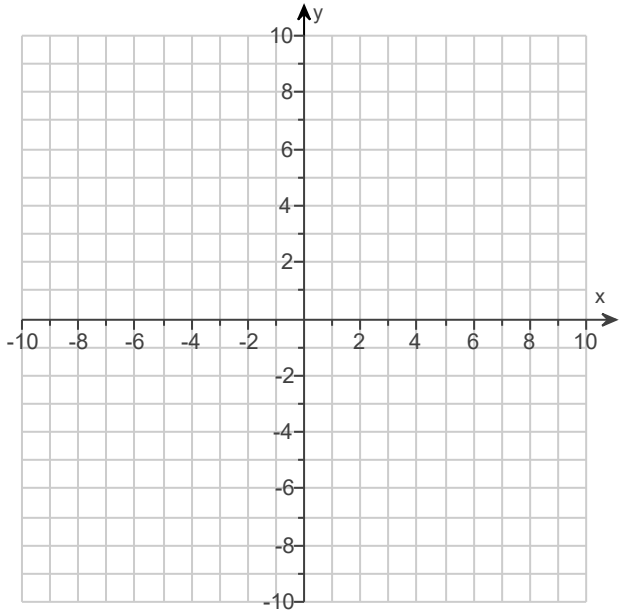
(a) The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Find the maximum or minimum function value. Select the correct choice below and fill in the answer box to complete your choice.
(Type an integer or a fraction.)

- **A.** The maximum function value is _____.
- **B.** The minimum function value is _____.

(b) Use the graphing tool to graph the function.



30. For the following quadratic function, **(a)** find the vertex, the axis of symmetry, and the maximum or minimum function value, and **(b)** graph the function.

$f(x) = 2x^2 - 12x + 16$

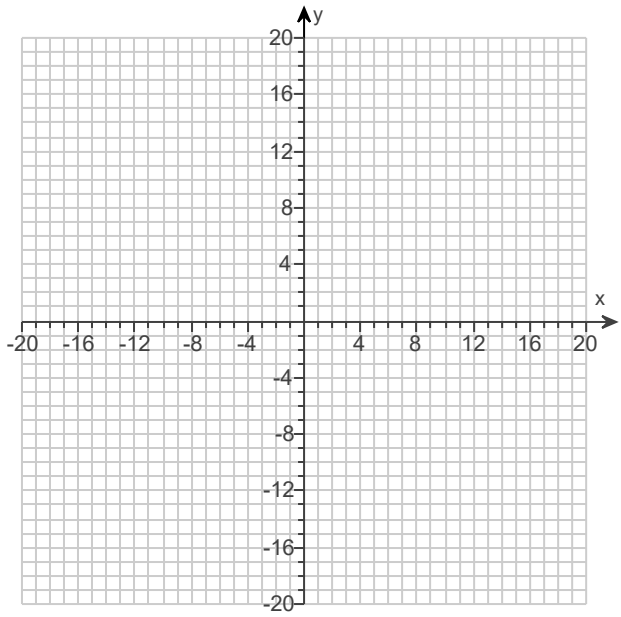
(a) The vertex is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation.)

Find the maximum or minimum function value. Select the correct choice below and fill in the answer box to complete your choice.
(Type an integer or a fraction.)

- **A.** The maximum function value is _____.
- **B.** The minimum function value is _____.

(b) Use the graphing tool to graph the function.



31. Find the x-intercepts and y-intercepts.

$f(x) = -x^2 + 8x + 20$

Find the x-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is(are) _____.
  (Type an ordered pair. Type an exact answer in simplified form. Use commas to separate answers as needed.)
- **B.** There is no x-intercept.

Find the y-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept(s) is(are) _____.
  (Type an ordered pair. Type an exact answer in simplified form. Use commas to separate answers as needed.)
- **B.** There is no y-intercept.

32. Find any x-intercepts and the y-intercept. If no x-intercepts exist, state this.

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

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercepts are _____.
  (Simplify your answer. Type an ordered pair. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)
- **B.** There is no x-intercept.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept is _____.
  (Simplify your answer. Type an ordered pair. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)
- **B.** There is no y-intercept.

33. Find the x-and y-intercepts.

$f(x) = 5x^2 - x + 15$

Find the y-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept is _____. (Simplify your answer. Type an ordered pair.)
- **B.** There is no y-intercept.

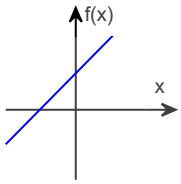
Find the x-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

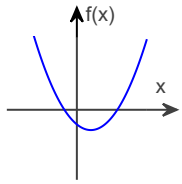
- **A.** The x-intercept is _____. (Simplify your answer. Type an ordered pair.)
- **B.** There is no x-intercept.

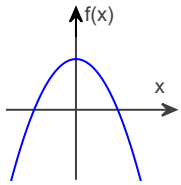
34. Match the following description with the graph that displays that characteristic.

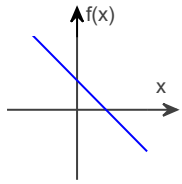
A minimum value of f(x) exists.

Choose the correct graph below.

A. 

B. 

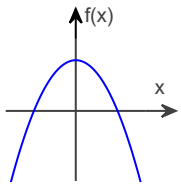
C. 

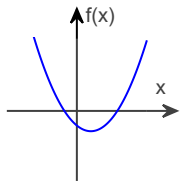
D. 

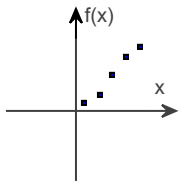
35. Match the following description with the graph that displays that characteristic.

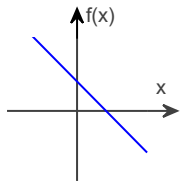
No maximum or minimum value of f(x) exists.

Choose the correct graph below.

A. 

B. 

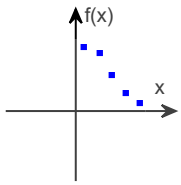
C. 

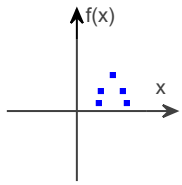
D. 

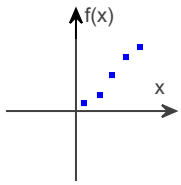
36. Match the following description with the graph that displays that characteristic.

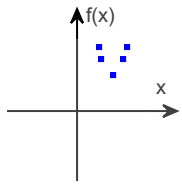
The data points appear to suggest that g is a quadratic function with a maximum.

Choose the correct graph below.

A. 

B. 

C. 

D. 

37. A farmer decides to enclose a rectangular garden, using the side of a barn as one side of the rectangle. What is the maximum area that the farmer can enclose with 20 ft of fence? What should the dimensions of the garden be to give this area?

The maximum area that the farmer can enclose with 20 ft of fence is _____ (1) _____

The larger dimension of the garden to give this area is _____ (2) _____ and the smaller dimension is _____ (3) _____

(1) ○ sq ft. ○ ft. ○ sq yd. ○ yd.

(2) ○ sq yd ○ ft ○ sq ft ○ yd

(3) ○ sq ft. ○ ft. ○ sq yd. ○ yd.

38. Find the linear function, $f(x) = mx + b$, whose graph has the given slope and y-intercept.

Slope is $-\frac{9}{5}$ and y-intercept is $(0, -9)$.

The linear function is $f(x) =$ _____.

39. Find an equation in point-slope form for the line having the slope $m = 2$ and containing the point (1,6).

The equation in point-slope form is _____.
(Use integers or fractions for any numbers in the equation.)

40. Find an equation of the line containing the following pair of points. Write your final answer as a linear function in slope-intercept form.

$(-5,0)$ and $(0,2)$

$f(x) =$ _____ (Use integers or fractions for any numbers in the expression.)

41. Find an equation for the line perpendicular to $x + y = 14$ with y-intercept $(0, -35)$. Write the answer in slope-intercept form.

The equation of the line in slope-intercept form is _____.
(Simplify your answer. Do not factor. Use integers or fractions for any numbers in the equation.)

42. Find an equation of the following line.

horizontal line through (0,2)

The equation of the line is _____.
(Type your answer in standard form.)

43. Classify the following statement as either true or false.

The solution of $(x+9)(x-3) \le 0$ is $[-9,3]$.

Choose the correct answer below.

- **A.** True, because the inequality $(x+9)(x-3) \le 0$ is satisfied for the interval $[-9,3]$.
- **B.** False, because the inequality $(x+9)(x-3) \le 0$ is satisfied for the interval $(-3,9)$.
- **C.** True, because the inequality $(x+9)(x-3) \le 0$ is satisfied for the interval $(-9,3)$.
- **D.** False, because the inequality $(x+9)(x-3) \le 0$ is satisfied for the interval $[-3,9]$.

44. Classify the following statement as either true or false.

The solution of $(x-1)(x-5) > 0$ is $\{x \mid x < 1 \text{ or } x > 5\}$.

Choose the correct answer below.

- **A.** True, because the inequality $(x-1)(x-5) > 0$ is satisfied for the interval $[1,5]$.
- **B.** False, because the inequality $(x-1)(x-5) > 0$ is satisfied for the interval $(-\infty,1]$ or $[5,\infty)$.
- **C.** False, because the inequality $(x-1)(x-5) > 0$ is satisfied for the interval $(1,5)$.
- **D.** True, because the inequality $(x-1)(x-5) > 0$ is satisfied for the interval $(-\infty,1)$ or $(5,\infty)$.

45. Classify the following statement as either true or false.

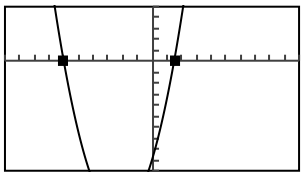
To solve $\frac{x+6}{x-4} < 0$ using intervals, divide the number line into the intervals $(-\infty,-6)$ and $(-6,\infty)$.

Choose the correct answer below.

- **A.** True, because the given rational expression is undefined for $x = -6$ and the solution of the related equation is $x = 4$.
- **B.** False, because the given rational expression is undefined for $x = 4$ and the solution of the related equation is $x = -6$.
- **C.** False, because the given rational expression is undefined for $x = -4$ and the solution of the related equation is $x = 6$.
- **D.** True, because the given rational expression is undefined for $x = 6$ and the solution of the related equation is $x = -4$.

46. Determine the solution of the following inequality from the given graph.

$2x^2 + 9x - 18 \le 0$



$[-10,10,-20,10]$
Xscl = 1 Yscl = 2

Plots $(-6,0)$ and $(\frac{3}{2},0)$

Choose the correct solution.

- **A.** $(-\infty,-6] \cup [-6,\infty]$
- **B.** $\left(-6,\frac{3}{2}\right)$
- **C.** $\left[-6,\frac{3}{2}\right]$
- **D.** $(-\infty,\infty)$

47. Solve the quadratic inequality.

$(x+1)(x+3) > 0$

Select the correct choice below and fill in any answer boxes in your choice.

- **A.** The solution set is _____. (Type your answer in interval notation.)
- **B.** There is no solution.

48. Solve.

$(x+19)(x-14) \le 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is {x| _____}.
  (Use at least one inequality or compound inequality to express your answer. For answers with more than one inequality, separate the inequalities by a comma or the word 'or'.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

49. Solve.

$x^2 - 3x - 4 < 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is $\{x|$ _____ $\}$.
  (Type an inequality. Use a comma to separate answers as needed.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

50. Solve.

$x^2 + 18x + 81 < 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is {x | _____}.
  (Simplify your answer.)
- **B.** There are infinitely many solutions.
- **C.** There is no solution.

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51. Solve.

$$\frac{1}{x-18} < 0$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is {x| _____}.
  (Use at least one inequality or compound inequality to express your answer. For answers with more than one inequality, separate the inequalities by a comma or the word 'or'.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

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52. Solve.

$$\frac{x+18}{x-5} > 0$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is {x| _____}.
  (Use at least one inequality or compound inequality to express your answer. For answers with more than one inequality, separate the inequalities by a comma or the word 'or'.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.