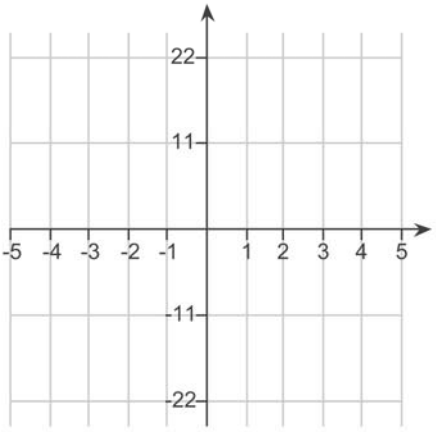
Student: _____	**Instructor:** KAREN BROWN	**Assignment:** 9.1 Vertex Graph of Polynomials
Date: _____	**Course:** Math 095: Intermediate Algebra (3)	
Time: _____	**Book:** Lehmann: Elementary and Intermediate Algebra: Functions and Authentic Apps, 1e	

1. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

$f(x) = 11x^2$

Use the graphing tool to graph the parabola.

Click to enlarge graph



The vertex is ☐.

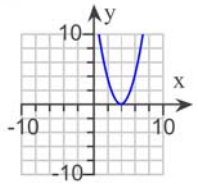
(Type an ordered pair.)

2. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

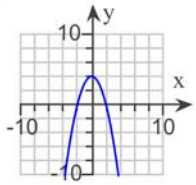
$$f(x) = \frac{1}{4}x^2$$

Choose the correct graph below.

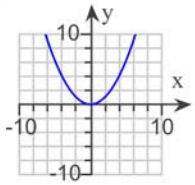
○A.



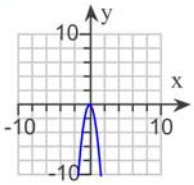
○B.



○C.



○D.



The coordinates of the vertex are ☐.

(Type an ordered pair.)

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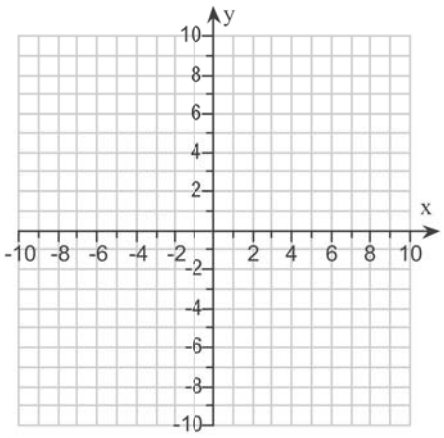
3. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

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

Use the graphing tool to graph the parabola.

Click to enlarge graph

The coordinates of the vertex are ☐.
(Type an ordered pair.)



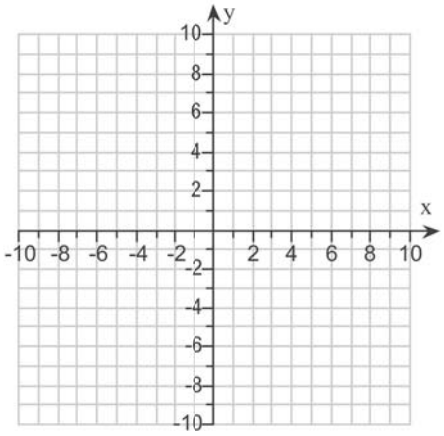
4. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

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

Use the graphing tool to graph the parabola.

Click to enlarge graph

The coordinates of the vertex are ☐.
(Type an ordered pair.)



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5. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

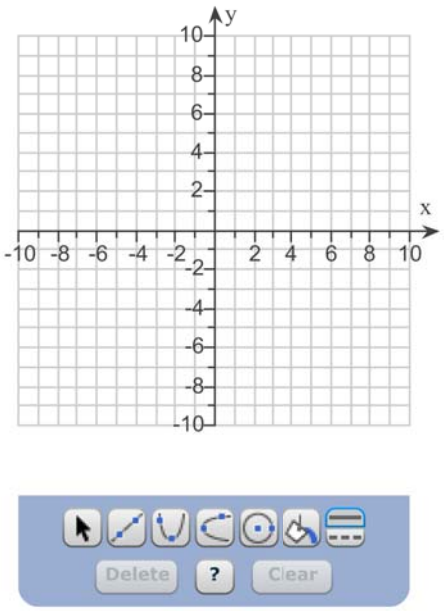
$f(x) = (x+1)^2 - 5$

Use the graphing tool to graph the parabola.

Click to enlarge graph

The vertex is ☐.

(Type an ordered pair.)



6. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

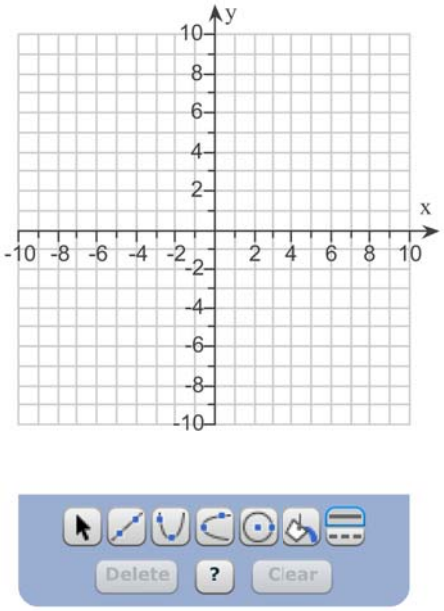
$f(x) = 3(x+3)^2 - 5$

Use the graphing tool to graph the parabola.

Click to enlarge graph

The vertex is ☐.

(Type an ordered pair.)



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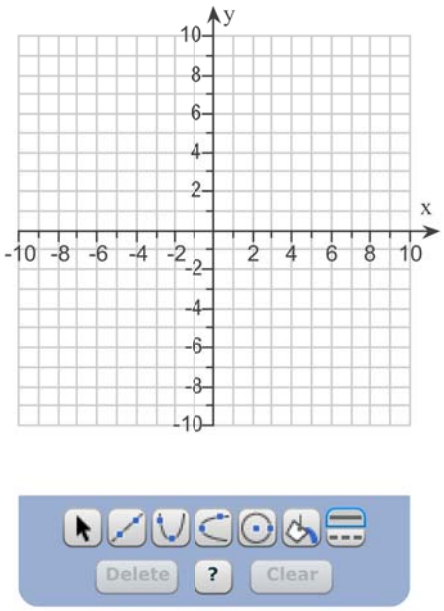
7. Graph the function by hand. Give the coordinates of the vertex. Then use a graphing calculator to verify your work.

$$f(x) = -\frac{1}{3}(x-5)^2 + 4$$

Use the graphing tool to graph the parabola.

Click to enlarge graph

The coordinates of the vertex are ☐.
(Type an ordered pair.)



8. Graph the function by hand.Then use a graphing calculator to verify your work. Also, find the domain and range of the function.

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

Use the graphing tool to graph the parabola.

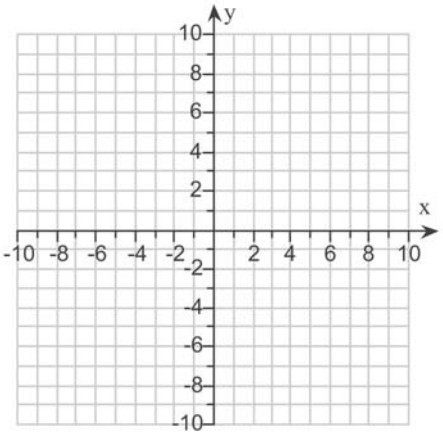
Click to enlarge graph

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

- ○A. The domain of f(x) is ☐.
  (Type an inequality or a compound inequality.)
- ○B. The domain of f(x) is all real numbers.

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

- ○A. The range of f(x) is ☐.
  (Type an inequality or a compound inequality.)
- ○B. The range of f(x) is all real numbers.



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9. Let $f(x) = (x-4)^2 + 2$.

a. Graph f by hand.

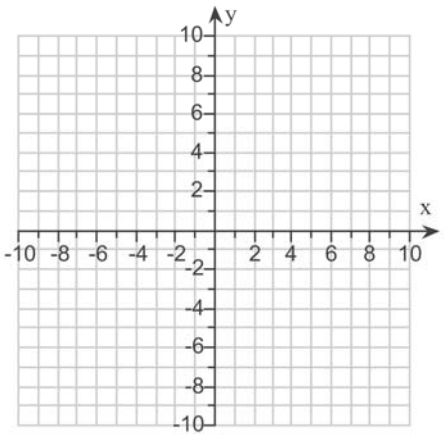
b. Find x when $f(x) = 3$.

c. Find x when $f(x) = 2$.

d. Find x when $f(x) = 1$.

a. Use the graphing tool to graph the parabola.

Click to enlarge graph



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

- ○ A. When $f(x) = 3$, $x =$ ☐. (Use a comma to separate answers as needed.)
- ○ B. The answer is undefined.

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

- ○ A. When $f(x) = 2$, $x =$ ☐. (Use a comma to separate answers as needed.)
- ○ B. The answer is undefined.

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

- ○ A. When $f(x) = 1$, $x =$ ☐. (Use a comma to separate answers as needed.)
- ○ B. The answer is undefined.

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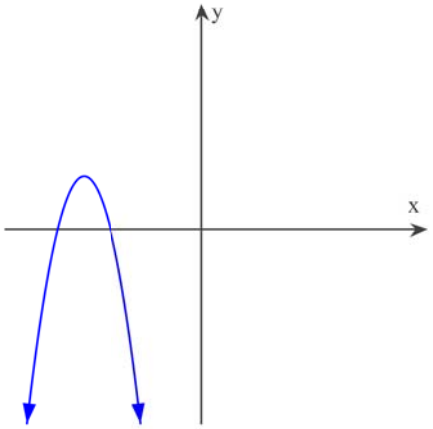
10. The function graphed below has the form $y = a(x - h)^2 + k$. Determine whether a, h, and k are positive, negative, or zero for the function.



Describe the constant a for the graph.

a ▾ 0

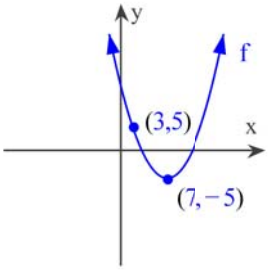
Describe the constant h for the graph.

h ▾ 0

Describe the constant k for the graph.

k ▾ 0

11. Find an equation of the function f graphed to the right.



f(x) = ☐ (Type your answer in vertex form.)

12. Decide whether it is possible for a parabola to have no x-intercepts. If it is possible, find an equation of such a parabola. If it is not possible, explain why.

Choose the correct answer below.

- ○ A. The parabola $y = (x - 5)^2 - 1$ has no x-intercept.
- ○ B. The parabola $y = (x - 5)^2$ has no x-intercept.
- ○ C. The parabola $y = (x - 5)^2 + 1$ has no x-intercept.
- ○ D. It is not possible. The x-axis must intersect the parabola at least once.

13. Decide whether it is possible for a parabola to have two x-intercepts. If it is possible, find an equation of such a parabola. If it is not possible, explain why.

Choose the correct answer below.

- A. The parabola $y = (x + 3)^2$ has two x-intercepts.
- B. The parabola $y = (x + 3)^2 - 2$ has two x-intercepts.
- C. The parabola $y = (x + 3)^2 + 2$ has two x-intercepts.
- D. It is not possible. The x-axis must intersect the parabola at most once.

14. Decide whether it is possible for a parabola to have three x-intercepts. If it is possible, find an equation of such a parabola. If it is not possible, explain why.

Choose the correct answer.

- A. Any horizontal line cannot intersect a parabola at more than 2 points. Therefore, it is impossible.
- B. It is possible. $y = (x - 2)^2$.
- C. It is possible. $y = (x + 2)^2 - 5$.
- D. It is possible. $y = (x + 2)^2 + 5$.

15. A student says that to graph $y = (x - 8)^2$, we translate the graph of $y = x^2$ up by 8 units. Is the student correct? Explain.

Choose the correct answer below.

- No
- Yes

The graph of $y = (x - 8)^2$, with $h = 8$, will translate the graph of $y = x^2$ to the [ ] by [ ] units.

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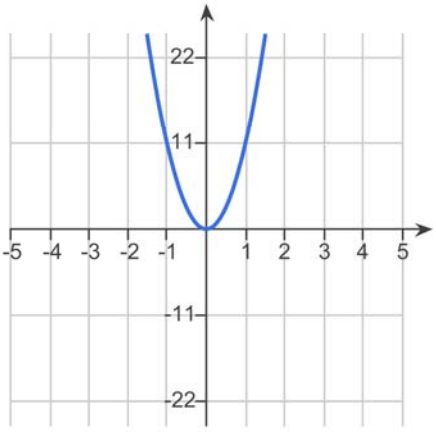
1.



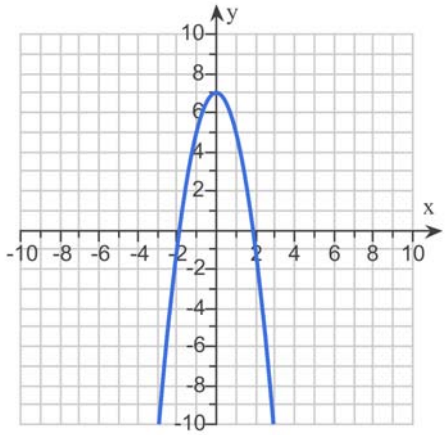
(0,0)

---

2. C

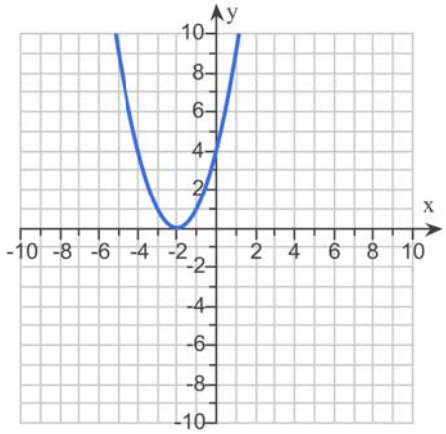
(0,0)

3.



(0,7)

4.



$(-2,0)$

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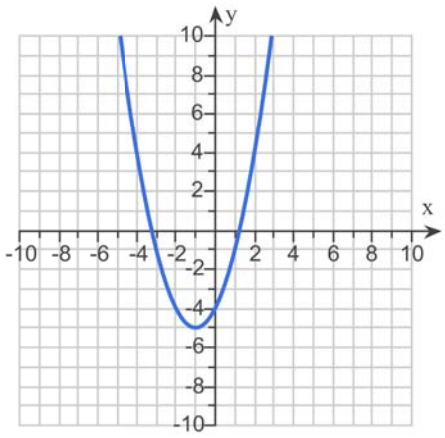
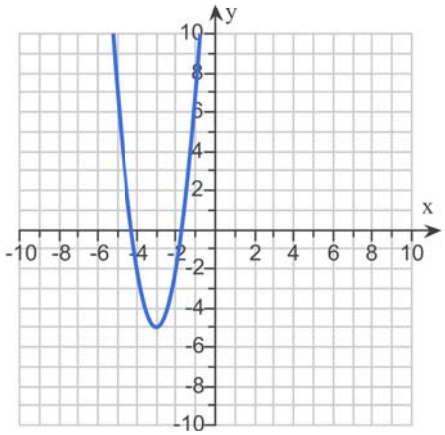
5.



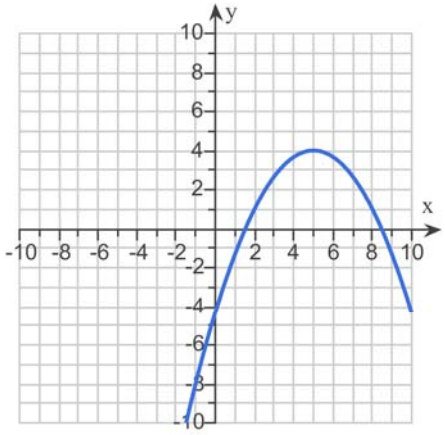
$(-1,-5)$

6.



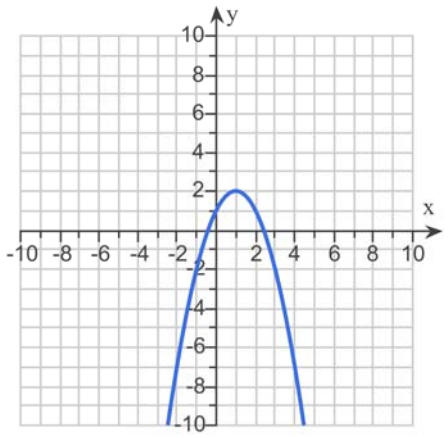
$(-3,-5)$

7.



(5,4)

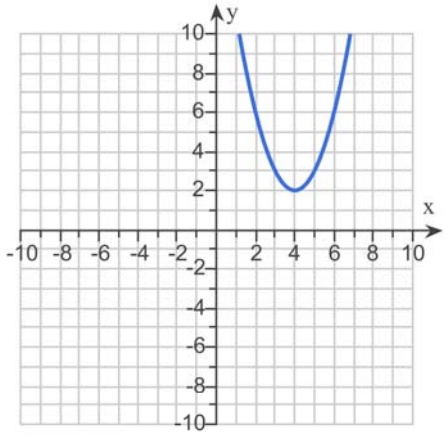
8.



B

A, $y \leq 2$

9.



A, 5,3

A, 4

B

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10. <

<

>

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11. $\frac{5}{8}(x-7)^2-5$

---

12. C

---

13. B

---

14. A

---

15. the first choice
right
8