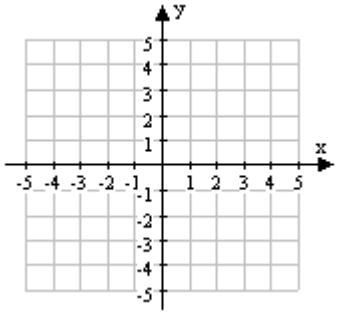
Section 5-5 Vertex Form

Name:

Consider the following EQUATIONS, make a table, plot the points, and graph what you think the graph looks like.

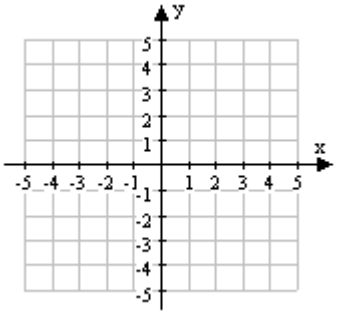
1. $y = x^2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



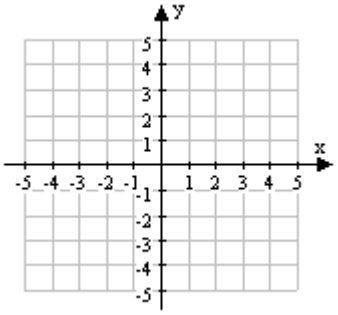
2. $y = 2x^2$

x	y
-2	
-1.5	
-1	
0	
1	
1.5	
2	



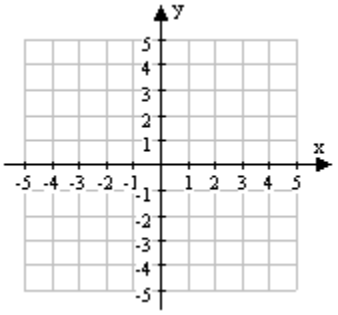
3. $y = 5x^2$

x	y
-1.5	
-1	
-0.5	
0	
0.5	
1	
1.5	



4. $y = 0.2x^2$

x	y
-4	
-2	
-1	
0	
1	
2	
4	



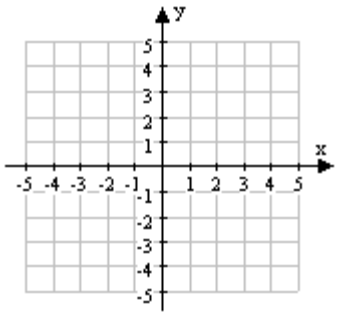
5. What happens to the graph as the number in front of x^2 gets larger? Smaller? _____

_____

_____

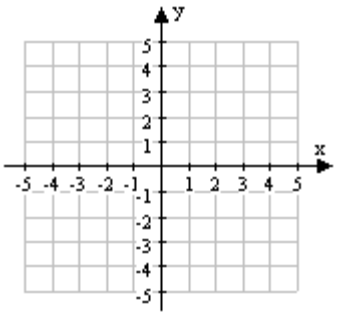
6. $y = -2x^2$

x	y
-2	
-1.5	
-1	
0	
1	
1.5	
2	



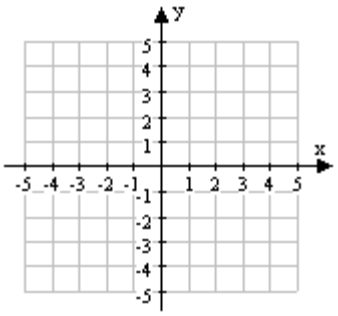
7. $y = -0.5x^2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



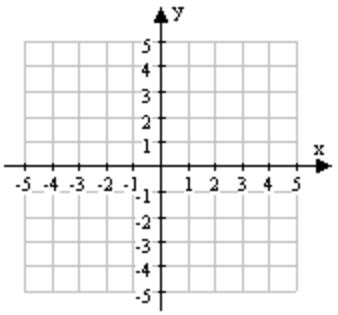
8. $y = x^2 + 1$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



9. $y = x^2 - 2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	

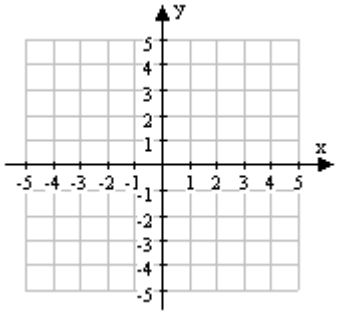


10. What happens to the graph as the number in front of x^2 is negative? _____

11. What happens when you add a number or subtract a number from x^2? _____

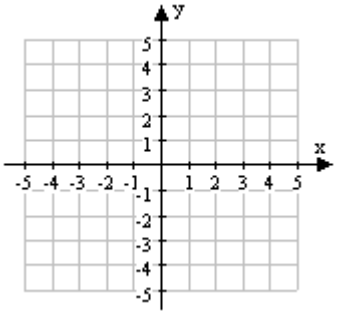
12. $y = (x+2)^2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



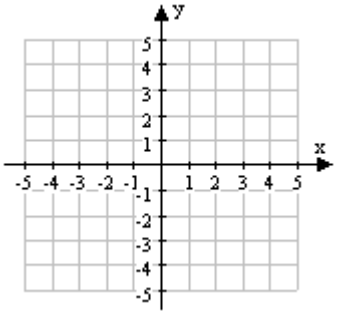
13. $y = (x-3)^2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



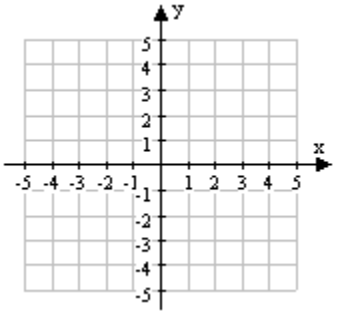
14. $y = (x+4)^2$

x	y
-5	
-4	
-3	
-2	
-1	
0	
1	



15. $y = -2(x-3)^2 + 2$

x	y
-1	
0	
1	
2	
3	
4	
5	



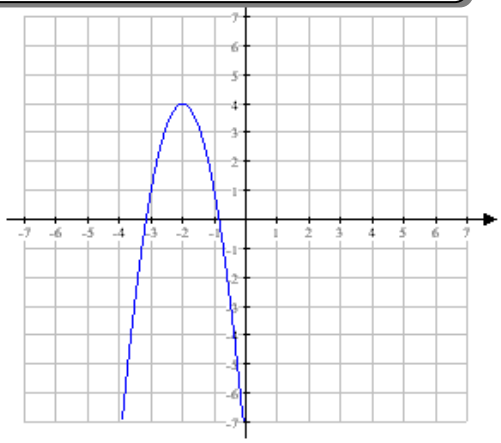
16. What happens when you add a number or subtract a number from x inside the parenthesis? _____

_____

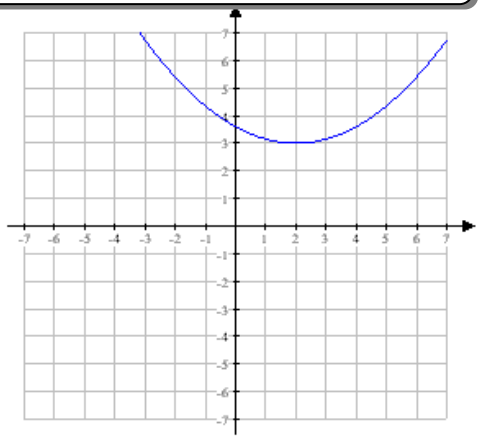
_____

17. What is a possible equation for the following graphs.

y = ____(x ____)^2____

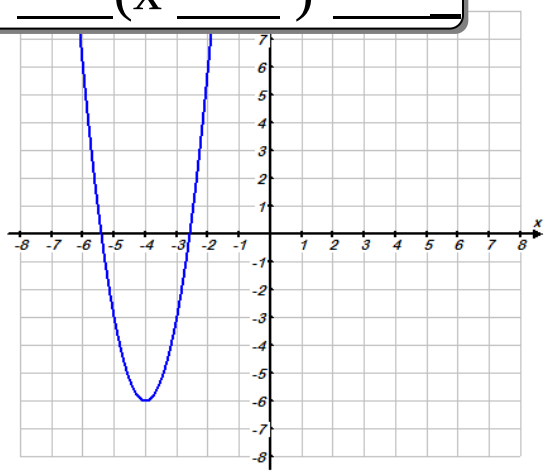


y = ____(x ____)^2____



y = ____(x ____)^2____

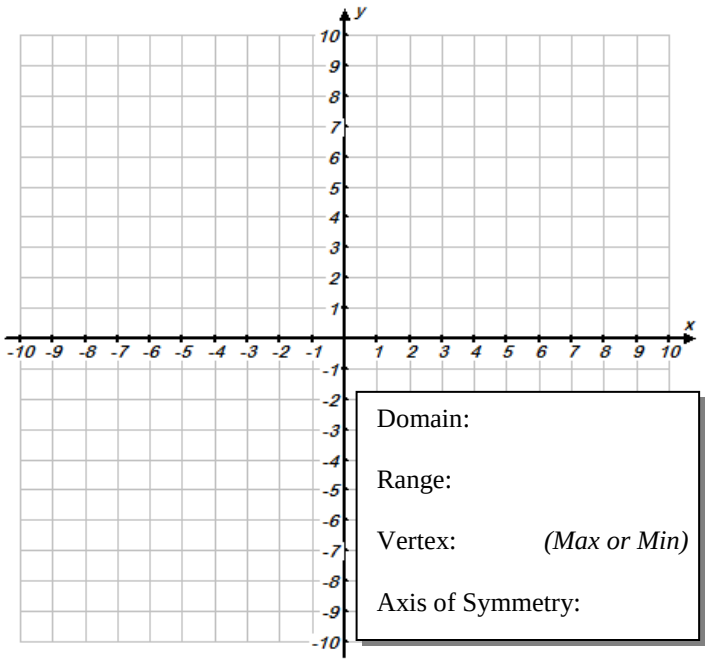
y = ____(x ____)^2____



18. Rewrite each of the following quadratics in vertex form by completing the square and graph.

a. $y = x^2 + 4x + 1$

b. $y = x^2 - 6x + 3$

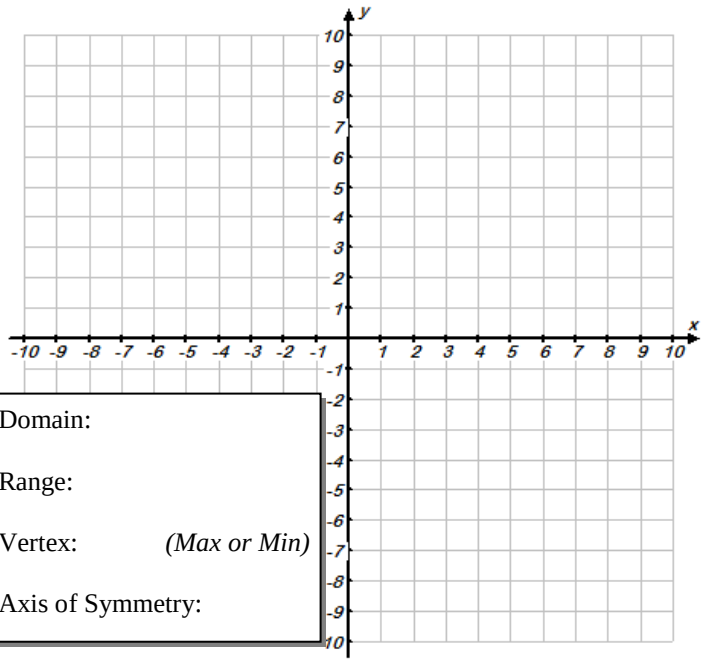


Domain:

Range:

Vertex: *(Max or Min)*

Axis of Symmetry:



Domain:

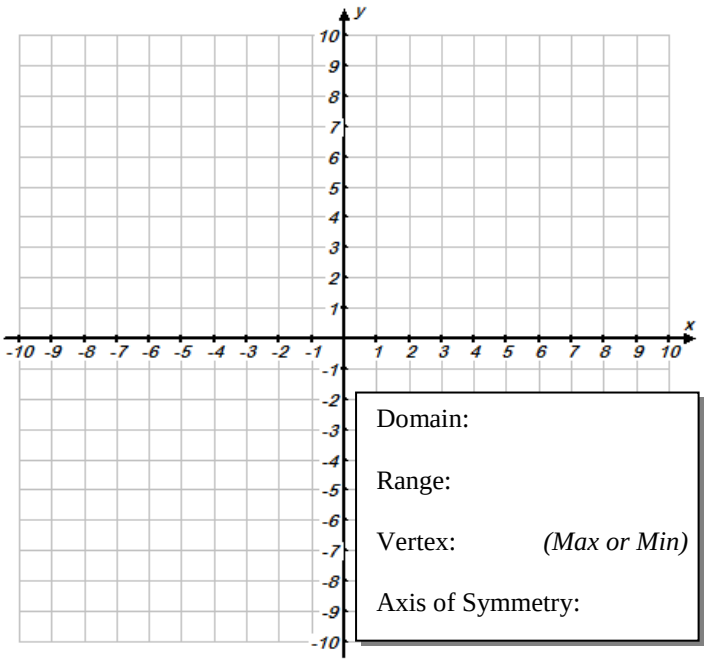
Range:

Vertex: *(Max or Min)*

Axis of Symmetry:

c. $y = 2x^2 + 12x + 13$

d. $y = -2x^2 + 16x - 27$

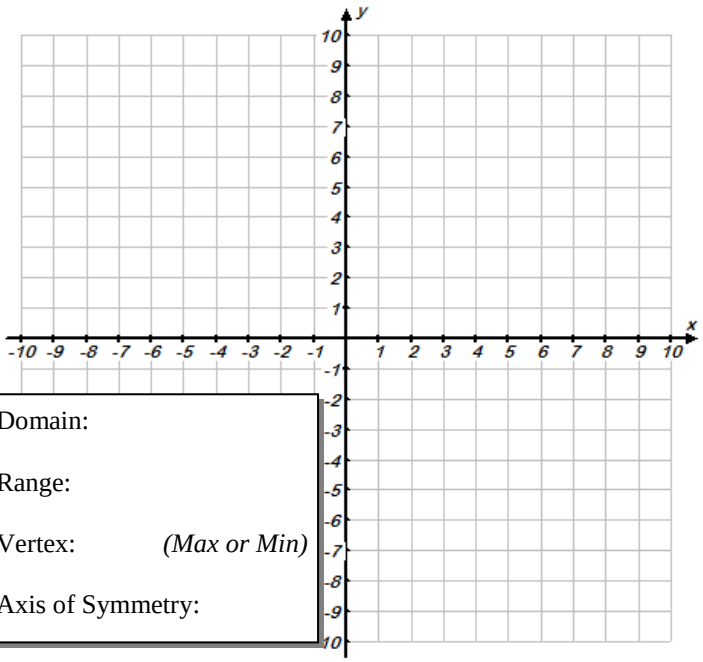


Domain:

Range:

Vertex: *(Max or Min)*

Axis of Symmetry:



Domain:

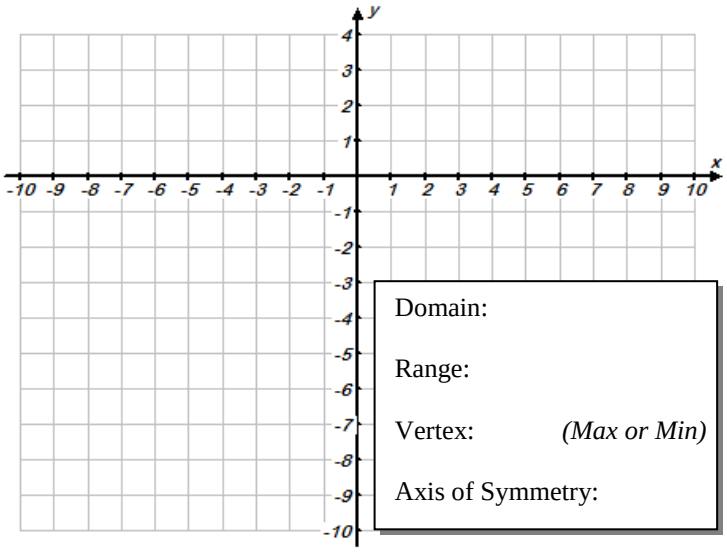
Range:

Vertex: *(Max or Min)*

Axis of Symmetry:

(18 continued) Rewrite each of the following quadratics in vertex form by completing the square and graph.

e. $y = x^2 + 7x + 6$



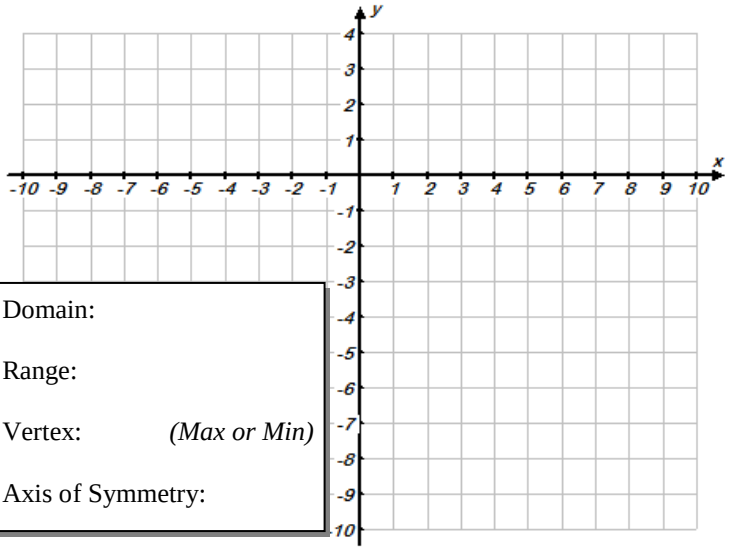
Domain:

Range:

Vertex: *(Max or Min)*

Axis of Symmetry:

f. $y = x^2 - 11x + 24$



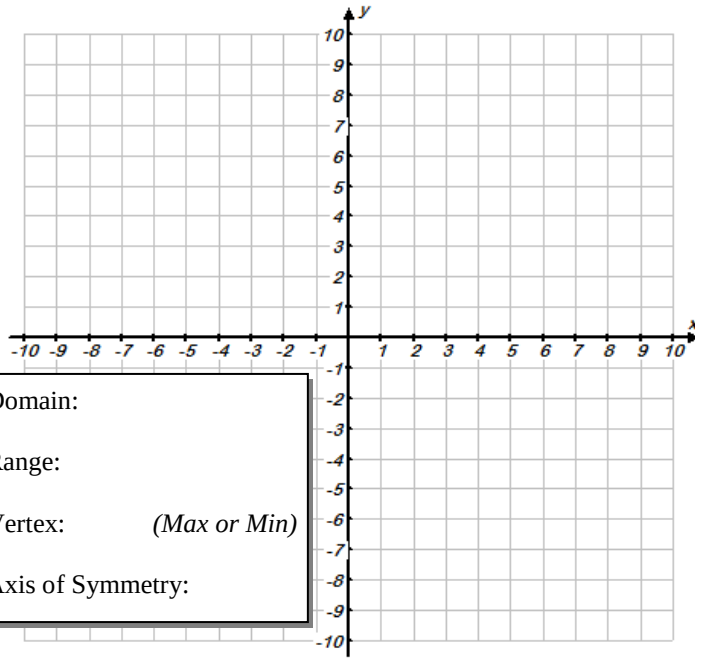
Domain:

Range:

Vertex: *(Max or Min)*

Axis of Symmetry:

g. $y = -3x^2 + 15x - 10$



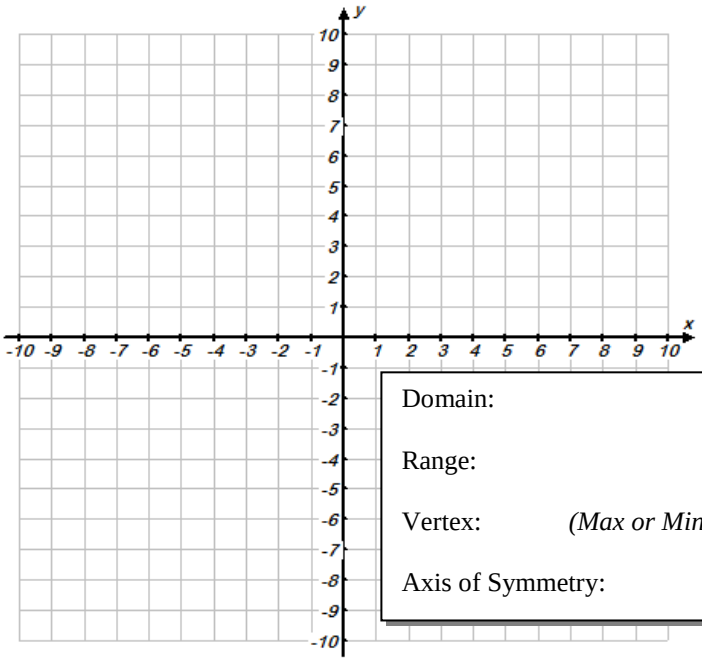
Domain:

Range:

Vertex: *(Max or Min)*

Axis of Symmetry:

h. $y = 2x^2 + 15x + 22$



Domain:

Range:

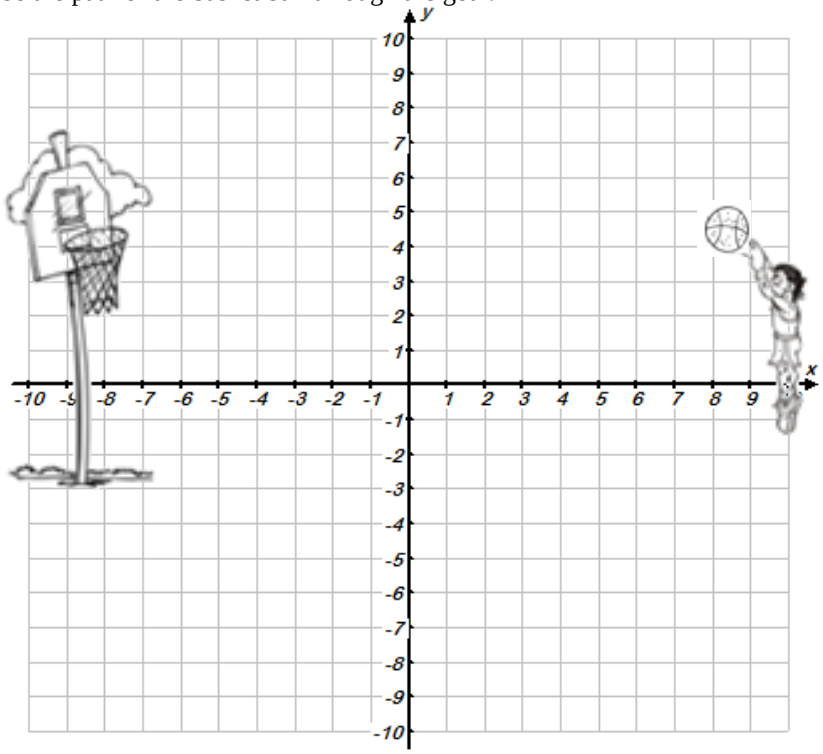
Vertex: *(Max or Min)*

Axis of Symmetry:

19. Create a parabola that you think would describe the path of the basket ball through the goal.

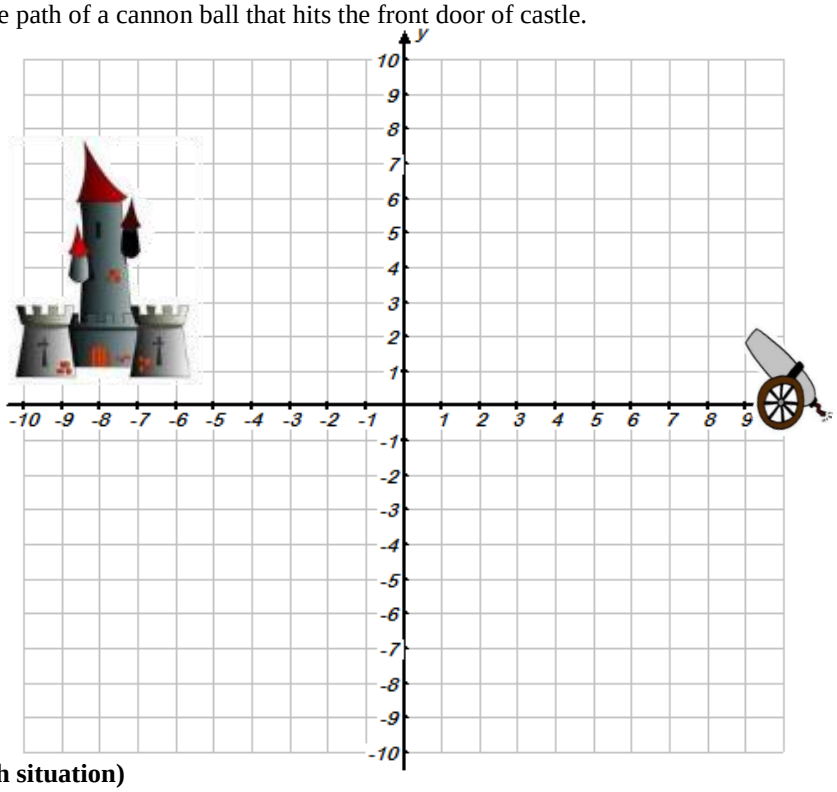
$y = \_\_\_\_(x \_\_\_\_)^2\_\_\_\_$

Graph it with your calculator to verify the parabola passes through the ball and hoop.



20. Create a parabola that you think would be the path of a cannon ball that hits the front door of castle.

$y = \_\_\_\_(x \_\_\_\_)^2\_\_\_\_$

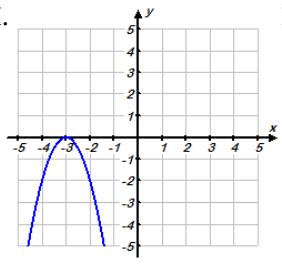


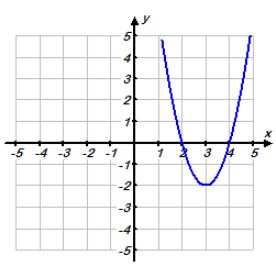
21. Matching (determine which graph matches which situation)

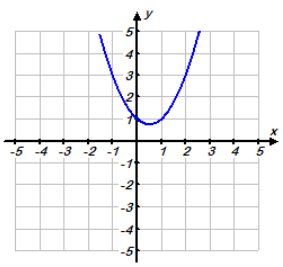
____a. Discriminant is positive.

____b. Discriminant is zero.

____c. Discriminant is negative.

I. 

II. 

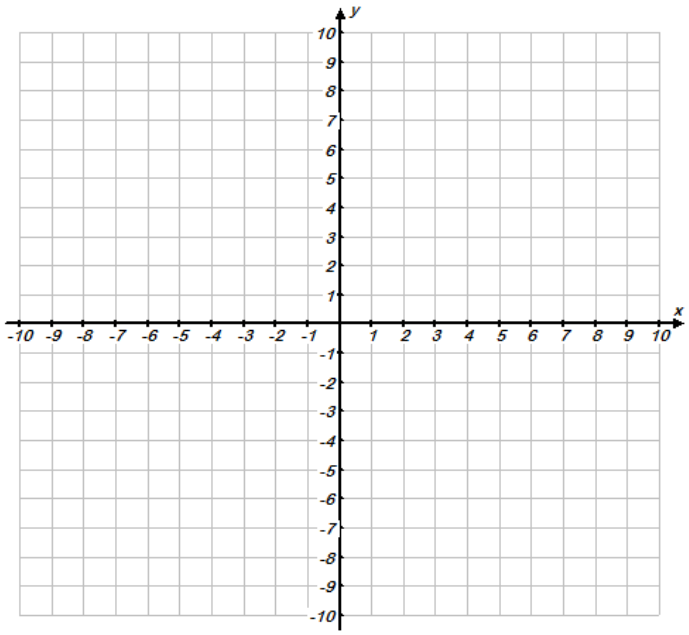
III. 

22. Consider the function: $f(x) = x^2 + x - 6$

a. What are the zeros of the function (using factoring)?

b. What is the axis of symmetry of the parabola?

c. What is the vertex of the parabola (graph the parabola)?

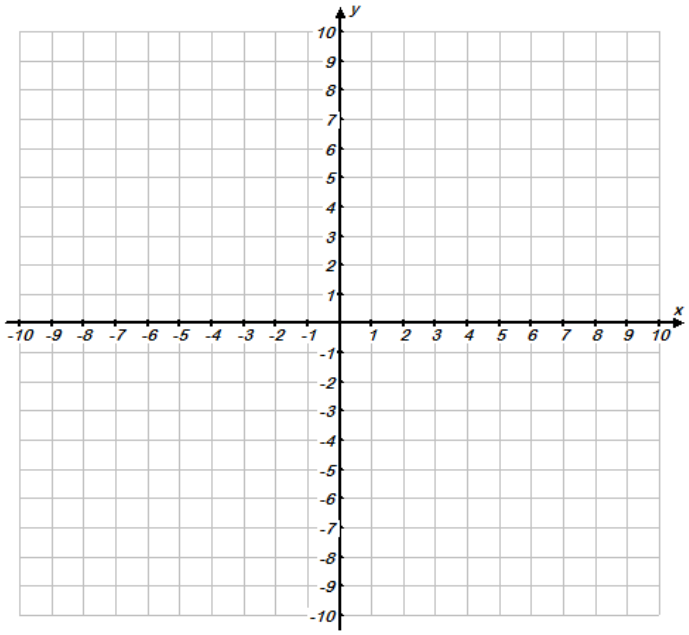


22. Consider the function: $f(x) = -x^2 + 8x - 15$

a. What are the zeros of the function (using factoring)?

b. What is the axis of symmetry of the parabola?

c. What is the vertex of the parabola (graph the parabola)?

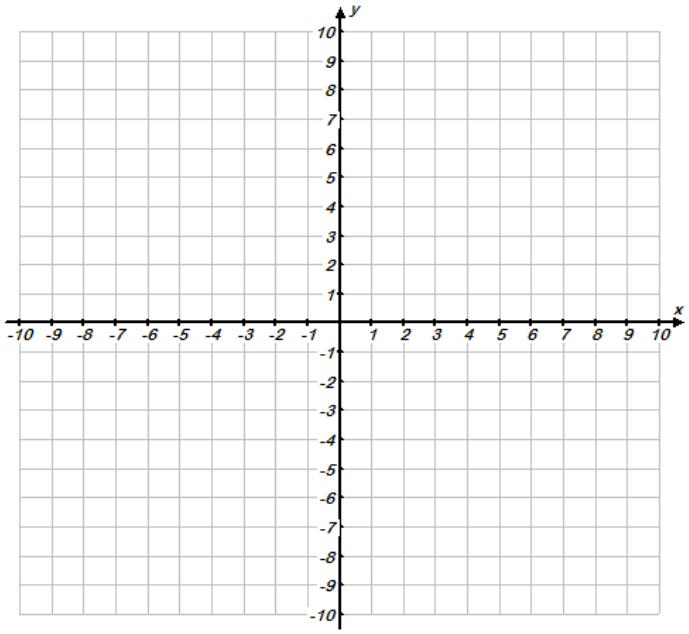


22. Consider the function: $f(x) = 2x^2 + x - 3$

a. What are the zeros of the function (using factoring)?

b. What is the axis of symmetry of the parabola?

c. What is the vertex of the parabola (graph the parabola)?



23. The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. How many items should the company sell to maximize their profit?

24. The expression $-16t^2 + 400t + 5$ represents the height of a cannonball t seconds after it was fired. What is the maximum height of the cannon ball and how many seconds did it take to reach its maximum height?

25. The expression $x^2 - 44x + 490$ represents the cost in \$1000 of dollars per year that company must spend out of pocket on each employee for health insurance for x number of employees. How many employees should the company hire to minimize their cost of health insurance?