Bell Ringer

Thursday 10/4

Evaluate each expression for a= -1, b= 3, and c= -2.

1. $2a - b^2 + c$

$2(-1) - (3)^2 + (-2)$

$-2 - 9 - 2$

-13

2. $\frac{b^2-4ac}{2a}$

$\frac{3^2 - 4(-1)(-2)}{2(-1)}$

$\frac{9-8}{-2} = \frac{1}{2}$

$-\frac{1}{2}$

Factor each.

3. $4x^2 + 4x + 1$

4. $12y^2 + 8y - 15$

Correct Quiz 3A Review

Name: _____ Hour: _____

QUIZ 3A REVIEW!!!!

Solve using the method of your choice. Show all of your work. ☺

1. $3x^2 - 24x = 0$
2. $10x^2 = 8x$
3. $5x^2 = 35x$
4. $x^2 - x - 12 = 0$
5. $x^2 + 8x + 5 = 25$
6. $6x - 9 = x^2$
7. $2x^2 + 9x = 35$
8. $3x^2 - 2x = 8$
9. $8x^2 - 6x + 1 = 0$
10. $24x^2 = 72$
11. $2x^2 = 32$
12. $3x^2 - 192 = 0$
13. $x^2 - 8x = -5$
14. $3x^2 - 2x - 6 = 0$
15. $2x^2 + 3x = 6$

Name: Key Hour: _____

QUIZ 3A REVIEW!!!!

Solve using the method of your choice. Show all of your work. ☺

1. $3x^2 - 24x = 0$

$3x(x-8)=0$

$\frac{3x}{3}=\frac{0}{3}$ $x-8=0$ $+8\ +8$

$x=0$ $x=8$

2. $10x^2 = 8x$

$10x^2-8x=0$

$2x(5x-4)=0$

$2x=0$ $5x-4=0$

$x=0, \frac{4}{5}$

3. $5x^2 = 35x$

$5x^2-35x=0$

$5x(x-7)=0$

$5x=0$ $x-7=0$

$x=0, 7$

4. $x^2 - x - 12 = 0$

$(x-4)(x+3)=0$

$x-4=0$ $x+3=0$

$x=4, -3$

5. $x^2 + 8x + 5 = 25$

$-25\ -25$

$x^2+8x-20=0$

$(x+10)(x-2)=0$

$x+10=0$ $x-2=0$

$x=-10, 2$

6. $6x - 9 = x^2 - 6x + 9$

$-6x+9$

$x^2-6x+9=0$

$(x-3)(x-3)=0$

$x-3=0$

$x=3$

7. $2x^2 + 9x = 35$

$14 \times -5 = -70$, $14 + -5 = 9$

$2x^2+9x-35=0$

$(2x^2+14x)-(5x-35)=0$

$2x(x+7)-5(x+7)=0$

$(2x-5)(x+7)=0$

$2x-5=0$ $x+7=0$

$x=5/2, -7$

8. $3x^2 - 2x = 8$

$-6 \times 4 = -24$, $-6 + 4 = -2$

$3x^2-2x-8=0$

$(3x^2-6x)+(4x-8)=0$

$3x(x-2)+4(x-2)=0$

$(x-2)(3x+4)=0$

$x-2=0$ $3x+4=0$

$x=2, -4/3$

9. $8x^2 - 6x + 1 = 0$

$-4 \times -2 = 8$, $-4 + -2 = -6$

$(8x^2-4x)-(2x+1)=0$

$4x(2x-1)-1(2x-1)=0$

$(4x-1)(2x-1)=0$

$4x-1=0$ $2x-1=0$

$x=1/4, 1/2$

10. $24x^2 = 72$

$\frac{24}{24}$ $\frac{}{24}$

$\sqrt{x^2}=\sqrt{3}$

$x=\pm\sqrt{3}$

11. $2x^2 = 32$

$\frac{2}{2}$ $\frac{}{2}$

$\sqrt{x^2}=\sqrt{16}$

$x=\pm 4$

12. $3x^2 - 192 = 0$

$+192\ +192$

$\frac{3x^2}{3}=\frac{192}{3}$

$\sqrt{x^2}=\sqrt{64}$

$x=\pm 8$

13. $x^2 - 8x = -5$

$a=1$ $b=-8$ $c=5$

$x^2-8x+5=0$

$x=\frac{8\pm\sqrt{(-8)^2-4(1)(5)}}{2(1)}$

$x=\frac{8\pm\sqrt{44}}{2}=\frac{8\pm 2\sqrt{11}}{2}$

$\sqrt{44}=2\sqrt{11}$, $4 \cdot 11$, $2 \cdot 2$

$x=4\pm\sqrt{11}$

14. $3x^2 - 2x - 6 = 0$

$a=3$ $b=-2$ $c=-6$

$x=\frac{2\pm\sqrt{(-2)^2-4(3)(-6)}}{2(3)}$

$x=\frac{2\pm\sqrt{76}}{6}$

$\sqrt{76}=2\sqrt{19}$, $4 \cdot 19$, $2 \cdot 2$

$x=\frac{2\pm 2\sqrt{19}}{6}=\frac{1\pm\sqrt{19}}{3}$

15. $2x^2 + 3x = 6$

$a=2$ $b=3$ $c=-6$

$2x^2+3x-6=0$

$x=\frac{-3\pm\sqrt{3^2-4(2)(-6)}}{2(2)}$

$x=\frac{-3\pm\sqrt{57}}{4}$

$\sqrt{54}$, $6 \cdot 9$, $2 \cdot 3$, $3 \cdot 3$

$x=\frac{-3\pm 3\sqrt{6}}{4}$

Turn in hw tracker --> Week 5-6

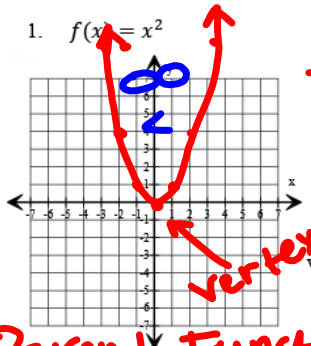
3.4 square root method ws (green)
3.5 solving quadratics ws (blue)
Disc and quad formula half sheet (yellow)
3.7B ws solving quadratics (pink)
Quiz 3A Review (white) /50

Geogebra

Translations of Quadratic Functions - Notes

Graph each function and state the vertex

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

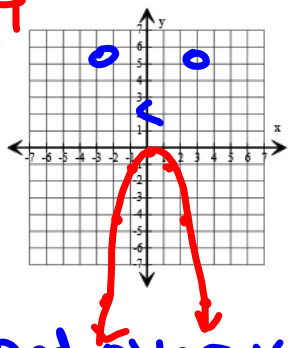


x	y
-2	$(-2)^2$ 4
-1	$(-1)^2$ 1
0	0
1	1
2	4

Vertex: (0, 0)

Parent Function

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

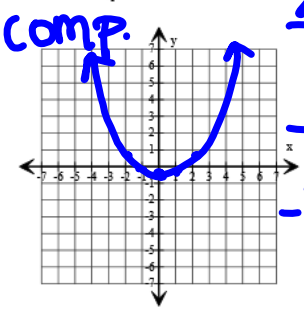


x	y
-2	$-(-2)^2$ -4
-1	$-(-1)^2$ -1
0	0
1	$-(1)^2$ -1
2	-4

Vertex: (0, 0)

3. What did the negative sign do to the graph? flipped over x-axis

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

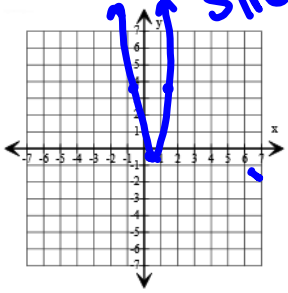


x	y
0	0
1	1/4
-1	1/4
2	1
-2	1

comp.

Vertex: (0, 0)

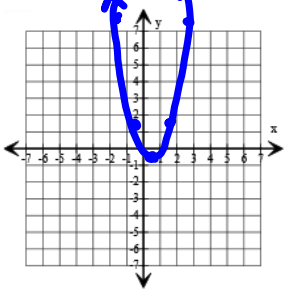
5. $f(x) = 4x^2$



stretch

Vertex: (0, 0)

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



Vertex: (0, 0)

7. What do you notice about the shape of each graph in relation to #1: $f(x) = x^2$? wider or narrower.

8. Order #s 4-6 from widest to narrowest: 4, 6, 5.

9. Without using a calculator to graph, make a prediction on the order from widest to narrowest for the following graphs:

a) $f(x) = 5x^2$ b) $f(x) = \frac{1}{2}x^2$ c) $f(x) = 2x^2$ d) $f(x) = \frac{1}{8}x^2$

Widest to narrowest: $f(x) =$ D $f(x) =$ B $f(x) =$ C $f(x) =$ A

1/8 1/2 2 5

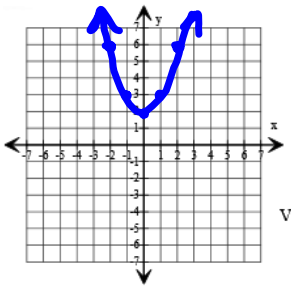
10. Generalization about $f(x) = ax^2$ graphs in relation to the parent graph $f(x) = x^2$:

$a > 1$, stretch

$0 < a < 1$, compress

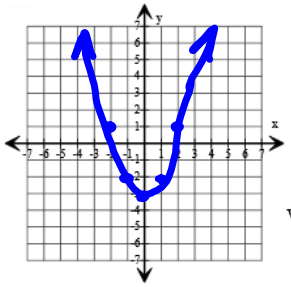
Graph each function. $f(x) = x^2 \pm k$

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



Vertex: (0 , 2)

12. $f(x) = x^2 - 3$



Vertex: (0 , -3)

13. What change do you notice in each of the graphs in relation to #1: $f(x) = x^2$? moves up or down

Without using a calculator to graph, make a prediction on what the following graphs will look like compared to $f(x) = x^2$.

14. $f(x) = x^2 - 3$ down 3

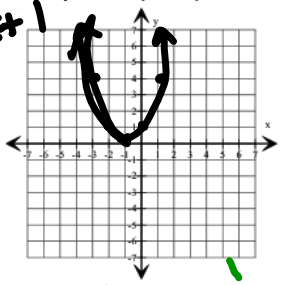
15. $f(x) = x^2 + 4$ up 4

16. $f(x) = -x^2 - 5$ down 5 reflect over x-axis

17. Generalization about $f(x) = x^2 \pm k$ graphs in relation to the parent graph $f(x) = x^2$.

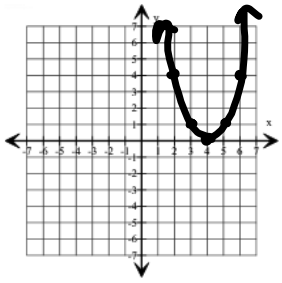
Graph each function. $f(x) = (x \pm h)^2$

18. $f(x) = (x + 1)^2$ left 1



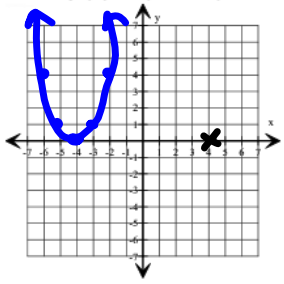
Vertex: (-1 , 0)

19. $f(x) = (x - 4)^2$ right 4



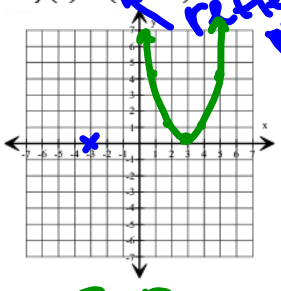
Vertex: (4 , 0)

20. $f(x) = (-x - 4)^2$ flip over y right 4



Vertex: (-4 , 0)

21. $f(x) = (-x + 3)^2$ left 3 reflect over y



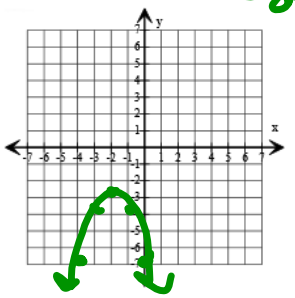
Vertex: (3 , 0)

21. What do you notice about the shape of each graph in relation to #1: $f(x) = x^2$? left or right

22. Generalization about $f(x) = a(x \pm h)^2$ graphs in relation to the parent graph $f(x) = x^2$: $(x+k) \rightarrow$ left k ... $(x-k) \rightarrow$ right k $(-x \pm k)$ reflect over y axis

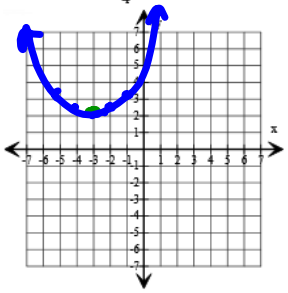
Without using a calculator to graph, make a prediction on what the following graphs will look like:

23. $f(x) = -(x + 2)^2 - 3$ left 2 down 3



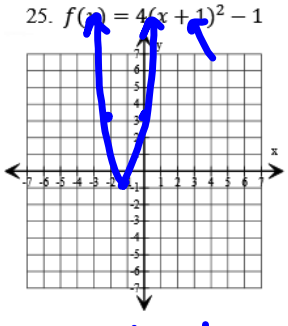
Vertex: (-2 , -3)

24. $f(x) = \frac{1}{4}(-x - 3)^2 + 2$ → 3 ↑ 2



Vertex: (-3 , 2)

25. $f(x) = 4(x + 1)^2 - 1$



Vertex: (-1 , -1)

Describe the transforation made to the parent function $f(x) = x^2$

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

↑ 5

Describe the transforation made to the parent function $f(x) = x^2$

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

← 3

Describe the transforation made to the parent function $f(x) = x^2$

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

↓ 4 flip over x

Describe the transforation made to the parent function $f(x) = x^2$

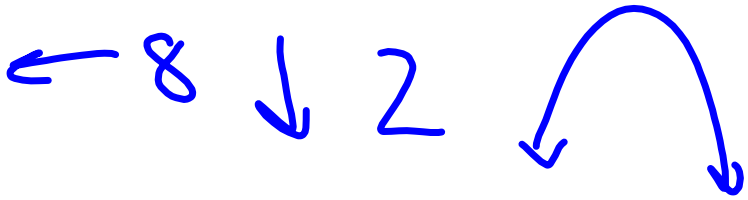
$f(x) = (x - 1)^2 + 3$

→ 1 ↑ 3

∴

Describe the transforation made to the parent function $f(x) = x^2$

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



Describe the transforation made to the parent function $f(x) = x^2$

$f(x) = (-x + 11)^2 + 7$

← 11 ↑ 7 flip over y

Equation of a Parabola

$$f(x) = a(x - h)^2 + k$$

Vertex: (h, k)

Due Tuesday - KEY Online...

Name_____ Hour_____ Ch 3 Translations of Quadratic Functions

For each function below, **(A)** identify the parent function, then **(B)** Describe in words the transformations made to the parent function.

1. $f(x)=x^2-3$

down 3

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

left 2

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

up 5

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

left 4
reflect over y

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

reflect over x-axis
stretch

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

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

down 2
compress

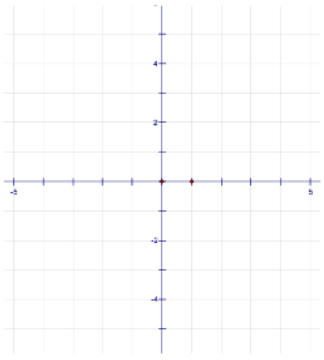
8. $f(x)=3x^2+1$

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

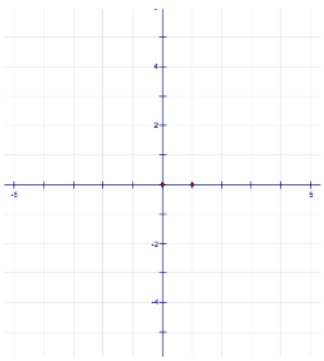
down 5
left 3
reflect over x-axis

Sketch a graph of the function with the indicated transformations. (No Calculator)

10. $f(x)=3(-x-5)^2+1$

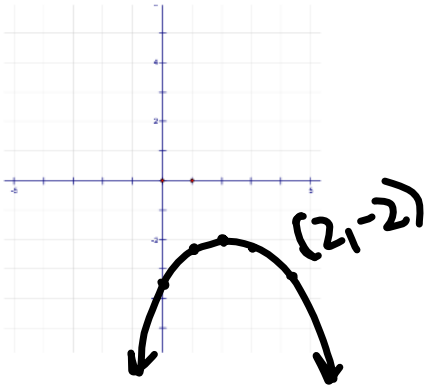


11. $f(x)=\frac{1}{2}(x-4)^2+3$

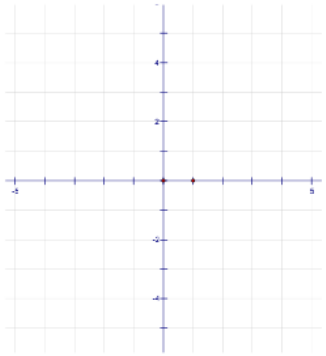


12. $f(x)=-\frac{1}{3}(-x+2)^2-2$

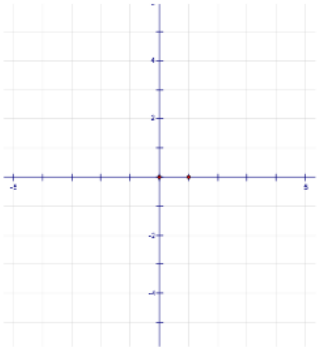
left 2
down 2



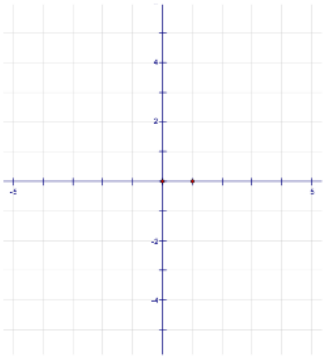
13. $f(x)=2(-x+1)^2-2$



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



15. $f(x)=-\frac{1}{2}(x-2)^2+1$



Write the function for $f(x) = x^2$ with the indicated transformations.

16. Vertical stretch by a factor of 3, horizontal shift left 5

$y=3(x+5)^2$

17. Moved 4 units right and 5 units down.

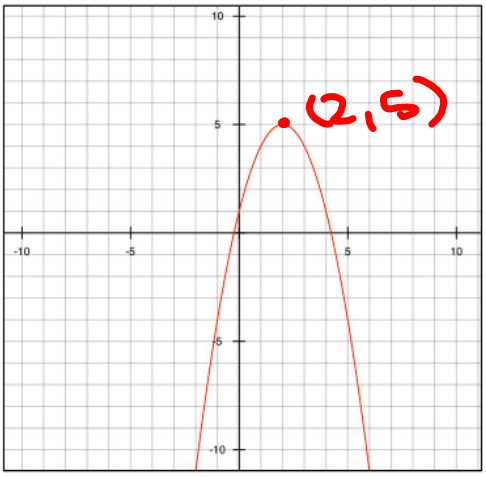
$y=(x-4)^2-5$

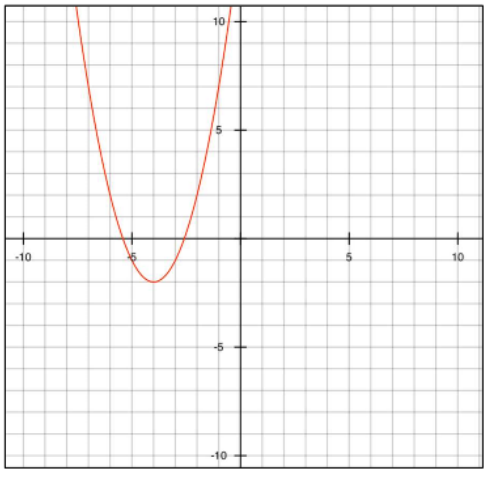
18. moved 6 units left and 2 units up.

Use the graphs below to identify each function. Write the function that corresponds to each graph.

19. $y=-(x-2)^2+5$

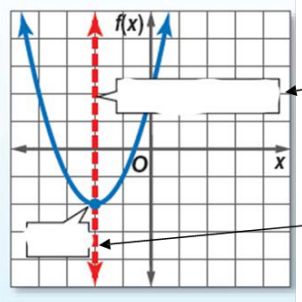
20. _____





1. Standard form of a quadratic function is y =

2. The shape of a quadratic function is called a



3.

4.

5. When a vertex is the highest point on the graph, we call that a

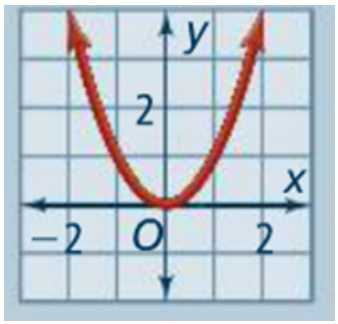
6. A Function that can be written in the form $y = ax^2 + bx + c$

7. Our solutions are the

8. Solutions to quadratic equations are called

9. When a vertex is at the lowest point on the graph, we call that a

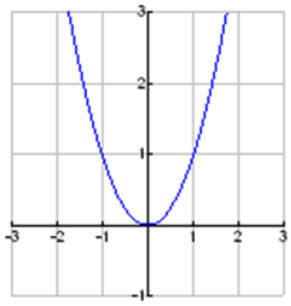
10. $y = x^2$



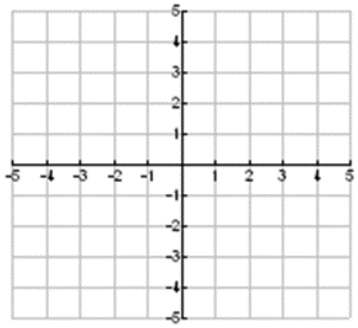
Quadratic Parent Function
axis of symmetry
minimum
x-intercepts
$ax^2 + bx + c$
maximum
zeros/roots/solutions
parabola
Quadratrtic Function
vertex

Notes Quadratic Translations

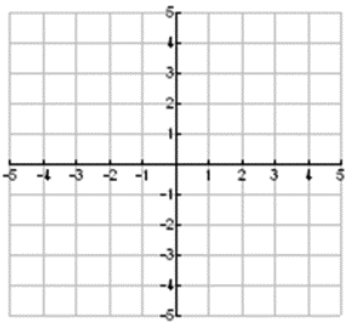
$f(x) = x^2$



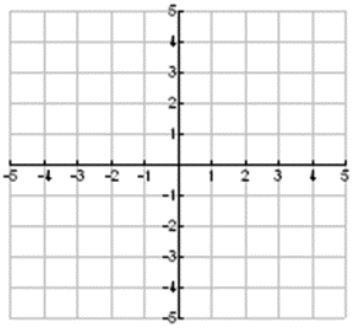
$f(x) = x^2 + 3$



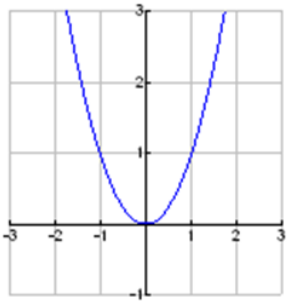
$f(x) = x^2 - 4$



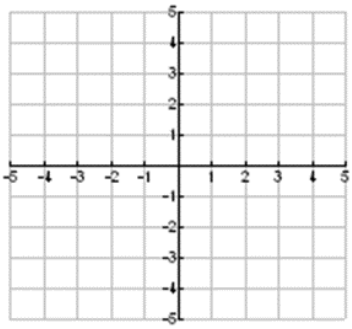
$f(x)=(x+2)^2$



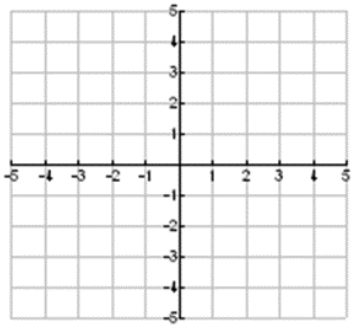
$f(x)=x^2$



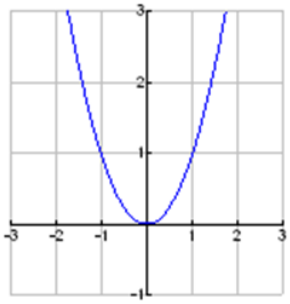
$f(x)=(x-1)^2$



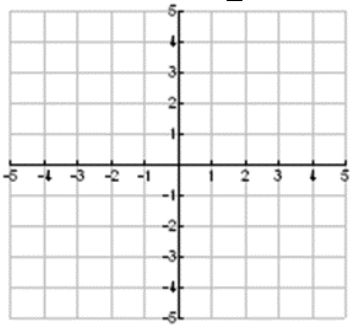
$f(x) = 2x^2$



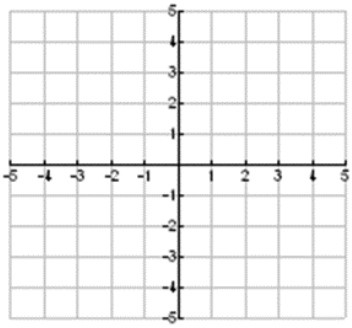
$f(x) = x^2$



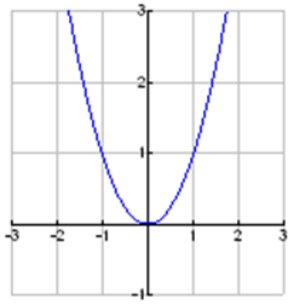
$f(x) = \frac{1}{2}x^2$



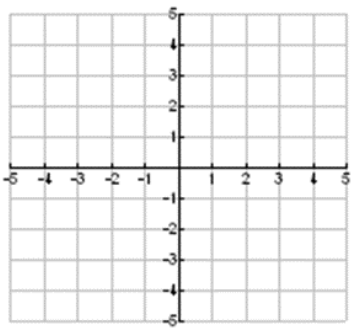
$f(x)=(x+3)^2-5$



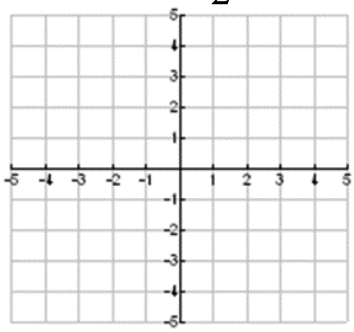
$f(x)=x^2$



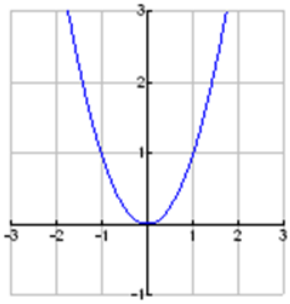
$f(x)=-(x-2)^2+4$



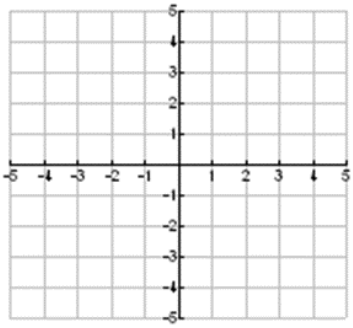
$f(x) = -\frac{1}{2}x^2 + 3$



$f(x) = x^2$



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



Summary of Transformations:

$f(x)+c$ c units up

$f(x)-c$ c units down

$f(x+c)$ c units left

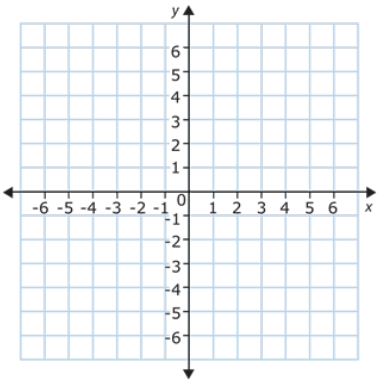
$f(x-c)$ c units right

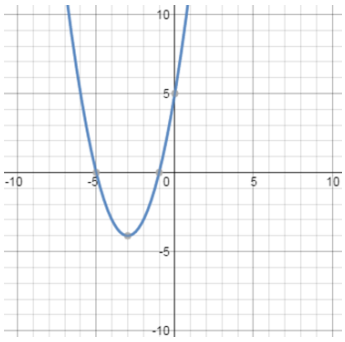
$-f(x)$ flip upside down

$f(-x)$ flip around the y-axis

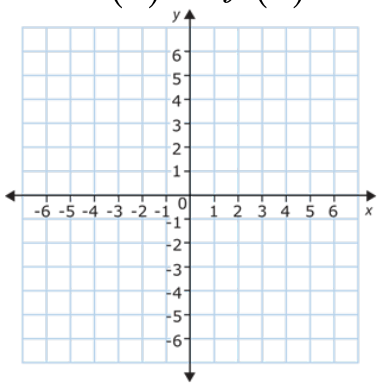
$cf(x)$ if $\begin{cases} c>1 \text{ then vertical stretch c units} \\ 0<c<1 \text{ then vertical shrink c units} \end{cases}$

$g(x) = f(x) - 1$

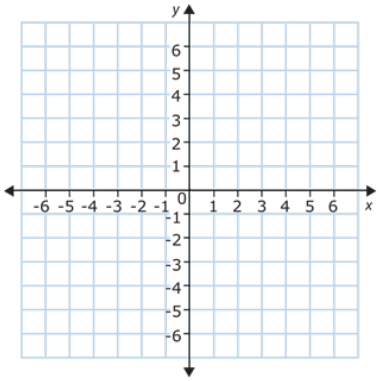

y
x
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
6 5 4 3 2 1 -1 -2 -3 -4 -5 -6

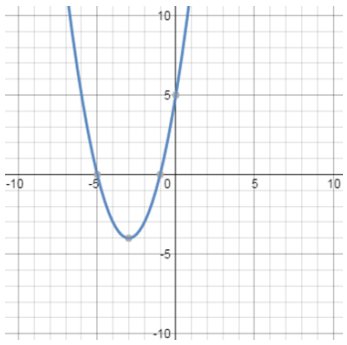

10
5
-10 -5 0 5 10
-5
-10

$h(x) = -f(x)$

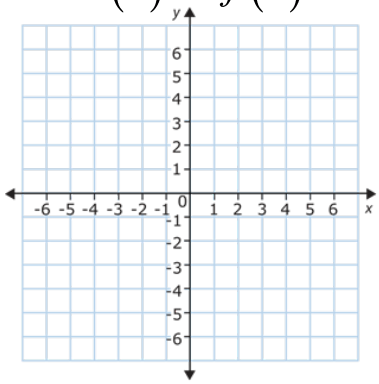

y
x
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
6 5 4 3 2 1 -1 -2 -3 -4 -5 -6

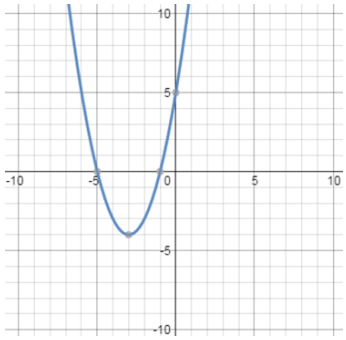
$k(x) = f(x+2)$


y
x
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
6 5 4 3 2 1 -1 -2 -3 -4 -5 -6

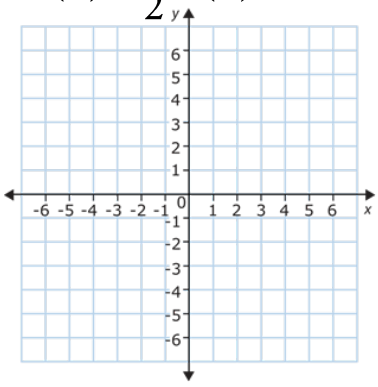

10
5
-10
-5
0
5
10
-5
-10

$m(x) = 3f(x)$


y
x
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
6 5 4 3 2 1 -1 -2 -3 -4 -5 -6



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



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