Quadratics Functions Review Name: Key

Part 1: Factoring

When factoring we want to find numbers that multiply to c!

that also add to b! $[ax^2+bx+c]$

Example: $x^2 - 2x - 8$

-8: $-4 \cdot 2$, $-8 \cdot 1$ ✗ — -8: $-2 \cdot 4$ ✗, $8 \cdot -1$ ✗

$(x-4)(x+2)$

Factor the following quadratics:

1. $x^2 + 8x + 12$

12: $6 \cdot 2$

$(x+6)(x+2)$

2. $x^2 - x - 12$

-12: $6 \cdot -2$, $3 \cdot -4$

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

3 $x^2 + 6x - 16$

16: $8 \cdot -2$

$(x+8)(x-2)$

4. $x^2 + 8x + 15$

15: $5 \cdot 3$

$(x+5)(x+3)$

5. $x^2 - 11x + 24$

24: $-8 \cdot -3$

$(x-8)(x-3)$

6. $x^2 + 5x - 14$

14: $-2 \cdot 7$

$(x+7)(x-2)$

7. $x^2 + 4x - 32$

32: $8 \cdot -4$

$(x+8)(x-4)$

8. $x^2 - 25$

25: $-5 \cdot 5$

$(x+5)(x-5)$

Difference of Squares!

* To Find factors on your calculator $Y= \#|X$

Quadratics Functions Review Name:_____

Part 2: Complete the Square

When completing the square we want to divide "b" by 2!

Next we want to. Square that & subtract from back.

Example: $y = x^2 - 12x + 28 - 36$

$\frac{-12}{2} = (-6)^2 = 36$

$(x - 6)^2 \quad -8$

Complete the square for the following quadratics:

1. $y = x^2 + 12x + 20$ -36

$\frac{12}{2} = (6)^2 = 36$

$(x+6)^2 \quad -16$

2. $y = x^2 + 8x + 16$ -16

$\frac{8}{2} = (4)^2 = 16$

$(x+4)^2 \quad +0$ Not needed!

2. $y = x^2 - 10x - 15$ -25

$\frac{-10}{2} = (5)^2 = 25$

$(x-5)^2 \quad -40$

4. . $y = x^2 - 18x + 80$ -81

$\frac{-18}{2} = (-9)^2 = 81$

$(x-9)^2 \quad -1$

5. $y = x^2 + 4x + 3$ -4

$\frac{4}{2} = (2)^2 = 4$

$(x+2)^2 \quad -1$

6. $y = x^2 - 16x + 200$ -64

$\frac{-16}{2} = (-8)^2 = 64$

$(x-8)^2 + 136$

Quadratics Functions Review Name:_____

Part 3: Vertex Form

We can describe transformations given the vertex form equation by using the following rules.

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

- $-a$: [-] Reflect over x-axis
- $|a|>1$: vertical stretch
- $|a|<1$: vertical shrink
- $(x-h)$: $+h$ left, $-h$ Right
- $+k$: up
- $-k$: down

Vertex: (h, k)

LOS: $x = h$

don't forget to change sign of h!

State the transformations given the following quadratics:

1. $y = -2(x-1)^2+1$

- Reflect over x-axis
- Vertical Stretch by 2
- Right 1
- Up 1

2. $y = .25(x+3)^2-5$

- vertical shrink by $\frac{1}{4}$ [.25]
- Left 3
- Down 5

3. $y = -(x+6)^2+4$

- Reflect over x-axis
- Left 6
- Up 4

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

- vertical stretch by 3
- Right 1
- Down 2

5. $y = .5x^2-7$

- Vertical shrink by $\frac{1}{2}$ [.5]
- Down 7.

6. $y = -(x+4)^2$

- Reflect over x-axis
- Left 4

Quadratics Functions Review Name: _____

Write the equation of the quadratic where the parent function has been translated:

1. Up 3, Left 6, Reflected over the x-axis: $-(x+6)^2+3$

2. Vertical Stretch by 5, Down 6, Right 2: $5(x-2)^2-6$

3. Left 2, Reflect over the x-axis, Up 4: $-(x+2)^2+4$

4. Vertical Shrink of .75, Reflect over the x-axis, Up 7: $-.75x^2+7$

State the vertex and line of symmetry of the following:

1. $y = -2(x-1)^2+1$

Vertex: $(1,1)$ LOS: $x=1$

2. $y = .25(x+3)^2-5$

Vertex: $(-3,-5)$ LOS: $x=-3$

3. $y = -(x+6)^2+4$

Vertex: $(-6,4)$ LOS: $x=-6$

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

Vertex: $(1,-2)$ LOS: $x=1$

5. $y = .5x^2-7$

Vertex: $(0,-7)$ LOS: $x=0$

6. $y = -(x+4)^2$

Vertex: $(-4,0)$ LOS: $x=-4$

Quadratics Functions Review

Name:_____

Part 4: Graphing Quadratics

We can determine a quadratic function easily by looking at a graph!

Quadratic Functions in Vertex Form and Factored Form:

First we want to identify the location of the vertex (min/max point)

Or x-intercepts (where it crosses x-axis)!

When putting it in the equation don't forget to change the sign of x.

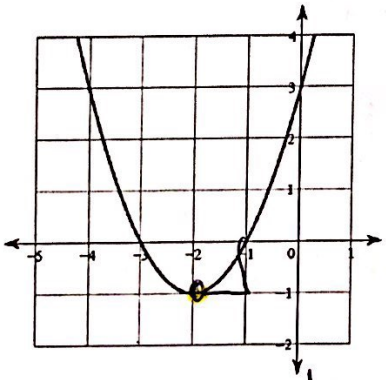
Next we want to determine if there have been any stretches/shrinks!

We can do this by going to vertex, 1 to the right → Go up/down that value is a!

Lastly, check for reflection by looking to see if your graph is frowning.

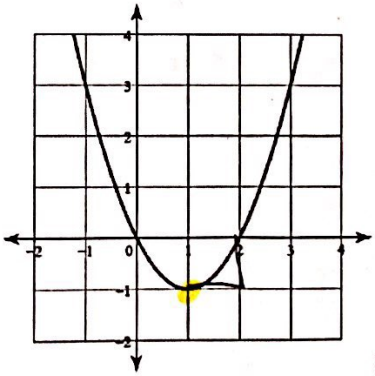
State the quadratic function for the following in Vertex Form:

1.



$(x+2)^2 - 1$

2.

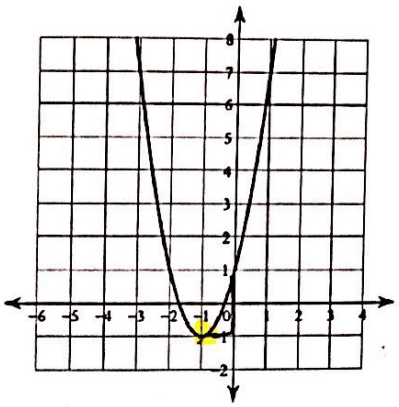


$(x-1)^2 - 1$

Quadratics Functions Review

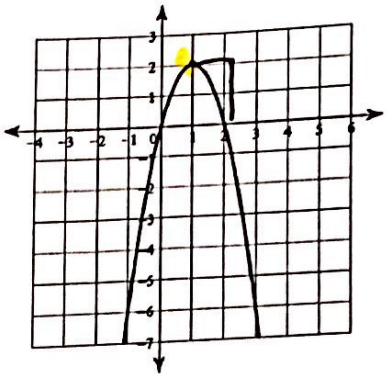
Name:_____

3.



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

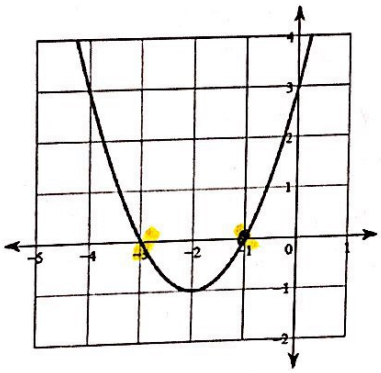
4.



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

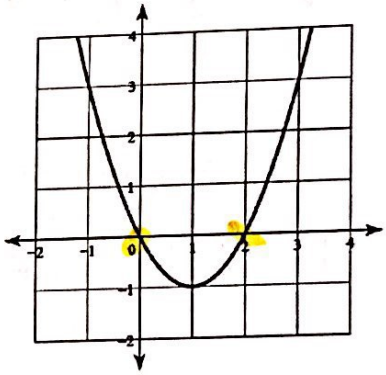
State the quadratic function for the following in Factored Form:

5.



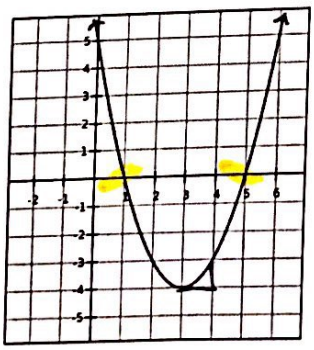
$(x+1)(x+3)$

6.



$(x \quad)(x-2)$

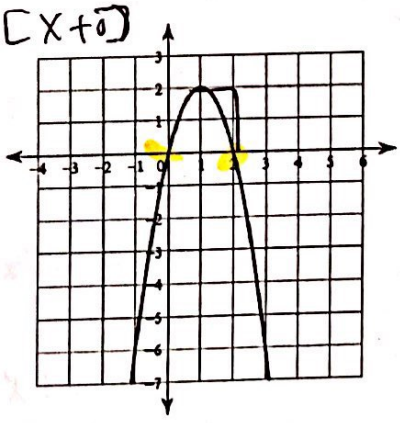
7.



$(x-1)(x-5)$

8.

$[x+0]$



$-2(x \quad)(x-2)$