 Standard form : $y = ax^2 + bx + c$

The Family of Parabolas

Academic Homework

Name KEY

Date _____ Period _____

1. Given the following equations, tell whether the parabola will open up or down. State the vertex point, the domain and the range. You may use your calculator to help!

	A. $y = -x^2$	B. $y = \frac{2}{3}x^2 + 2$	C. $y = -2x^2 - 3$
Opens	down	up	down
Vertex	(0,0) max	(0, 2) min	(0, -3) max
Domain	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$
Range	$\mathbb{R} \leq 0$	$\mathbb{R} \geq 2$	$\mathbb{R} \leq -3$

D. When graphed, which equation represents the widest parabola? $y = \frac{2}{3}x^2 + 2$

E. When graphed, which equation represents the narrowest parabola? $y = -2x^2 - 3$

2. Write a sentence comparing the graphs of equations with a positive coefficient ('a') of x^2 and graphs with a negative coefficient of x^2.

Parabolas with a positive 'a' will open up, but parabolas with a negative 'a' will open down

3. Write a sentence explaining what caused the graph of a parabola to shift up or down.

If the constant, 'c', is a positive it will shift up, but if it's negative it will shift down

4. Write an equation of a parabola whose graph lies between the graphs of $y = 2x^2 + 3$ and $y = 2x^2 + 5$.

$y = 2x^2 + 4$

5. Write an equation of a parabola whose graph lies between the graphs of $y = -3x^2$ and $y = -3x^2 - 2$.

$y = -3x^2 - 1$

6. Given the equation $y = x^2 + 2$, write the equation of the parabola if the graph has been shifted up 3. add 3 to 'c'

$y = x^2 + 5$

7. Given the equation $y = -3x^2 + 1$, write the equation of the parabola if the graph has been shifted up 5. add 5 to 'c'

$y = -3x^2 + 6$

8. Given the equation $y = 4x^2 - 3$, write the equation of the parabola if the graph has been shifted down 4. subtract 4 to 'c'

$y = 4x^2 - 7$

9. Given the equation $y = -2x^2 + 1$, write an equation of a parabola if the graph has been widened.

'a' needs to be less than $|-2|$

$y = \frac{1}{2}x^2 + 1$

10. Given the equation $y = -2x^2 + 5$, write an equation of a parabola if the graph has been narrowed.

'a' needs to be greater than $|-2|$

$y = -6x^2 + 5$