Day 10: Transformations of Quadractics

Warm-Up:

11. Using the discriminant, determine the amount and type of solutions each equation will have. Then find the exact value of the solutions.

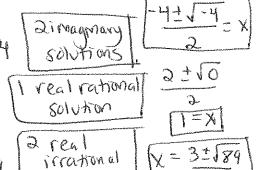
utions.

$$6^2-4ac$$

 $(4)^2-4(1)(5)=16-20=-4$

b.
$$x^2-2x+1=0$$
 6^2-4aC $(-3)^2-4(1)(1) = 4-4=0$

c.
$$2x^2 - 3x - 10 = 0$$
 $6^3 - 4 ac$ $(-3)^3 - 4(a)(-10) = 9 + 80 = 89$

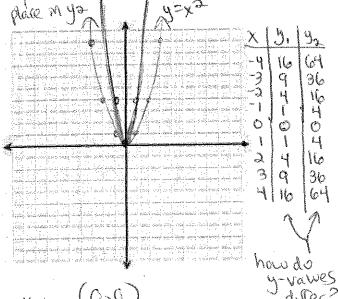


Solutions

Quadratic Graphs

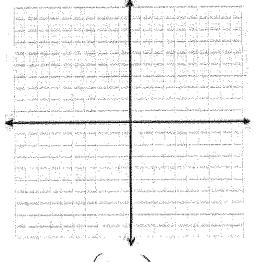
In your graphing calculator, graph the function $y = x^2$ (the quadratic parent function). Then graph each function below. Compare the new graph to the parent graph and write your observations about the location of the vertex, the overall shape, and the slope of the sides of the new graph in the blanks at the right.

Parent y=x2 has vertex (0,0) Splace in y, and make it bold Part A: The Effect of a 37 4x3 2. $y = \frac{1}{4}x^2$



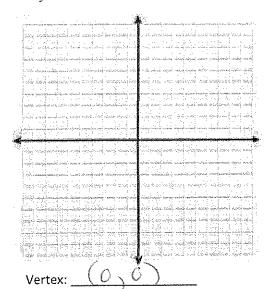
Shape Change or Shift Change?: Shape change
What was the change? graph 13 narrower

y-vawes where quadrupled
so graph 13 4 thres narrower



Shape Change or Shift Change?: Shape Change
What was the change? _ 9 aph 15 4x wider

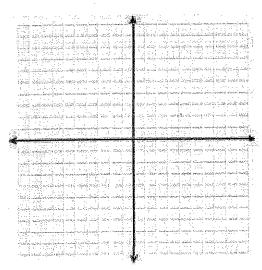
3. $y = -4x^2$



Shape Change or Shift Change?: Shape change
What was the change? H trues narrowers
reflected overx-axis

Part B: The Effect of h

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



Shape Change or Shift Change? : Shift Change
What was the change? 10 ft 2

4.
$$y = -\frac{1}{4}x^2$$

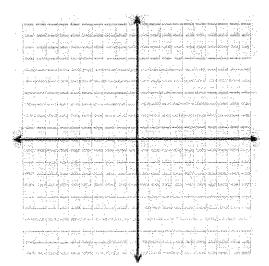
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Vertex: (0,0)

Shape Change or Shift Change?: Shape change
What was the change? H time S wide 5

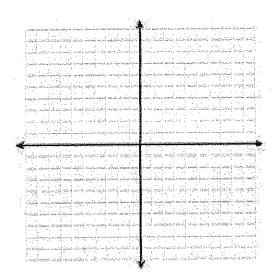
CESTECTED over x-axis

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



Vertex: (4,0)

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



Vertex: (-5)0)

Shape Change or Shift Change?: Shift change to the was the change? Left 5 to Yestected in X-ax S

8. $y = -(x-6)^2$

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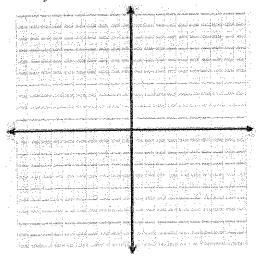
Vertex: (6,0)

Shape Change or Shift Change?: Sh Ff change

What was the change? rant 6 +

Part C: The Effect of k

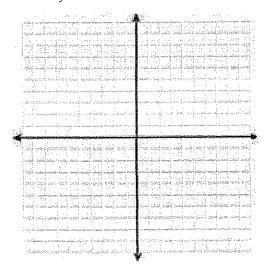
9. $y = x^2 + 1$



Shape Change or Shift Change? : Shift change

What was the change? ______ \(\frac{\rho}{2} \)

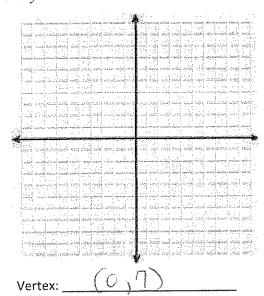
10. $y = x^2 - 2$



Shape Change or Shift Change?: Shift change

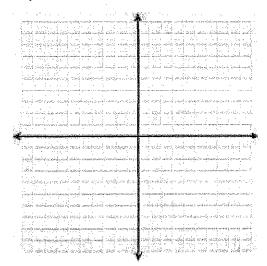
What was the change? down 2

11.
$$y = -x^2 + 7$$



Shape Change or Shift Change?: Shift Change What was the change? <u>reflected over</u> x-axis

12.
$$y = -x^2 - 10$$



Shape Change or Shift Change? : 5h,ft Change

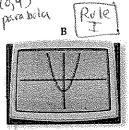
What was the change? <u>Veflected over Xaxis</u>

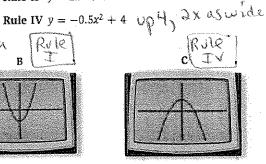
4 down 10

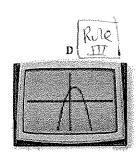
Practice

1) Use what you know about the connection between rules and graphs for quadratic functions to match the given functions with their graphs that appear below. Each graph is shown in the standard viewing window (-10 \le x \le 10 and $-10 \le y \le 10$ Rule II $y = 2x^2 + 4$ $\sqrt{p} \sqrt{\frac{1}{2}} \alpha S \omega d \alpha$

Rule I $y = x^2 - 4$ down Rule III $y = -x^2 + 2x + 4$ Rule $y = -x^2 + 2x + 4$ Rule III $y = -x^2 + 2x + 4$ Rule III $y = -x^2 + 2x + 4$ From parabola







2) In the discovery, you worked with several different quadratic functions. The function rules are restated in Parts a-d below. For each function, explain what you can learn about the shape and location of its graph by looking at the coefficients and constant term in the rule.

a. $h = 15 - 16t^2$ y-m+(0,15) ovp 15 from constant reflorer x-axis from coeff. \rightarrow 10 times narrower c. $y = 0.004x^2 - x + 80$ From constant > y-int(0,80); up80 From cuef. -> a= 4 = 250 9 250 horesnarrower

b. $h = 2 + 40t - 16t^2$ y-int (0,2) \in from refl over x-axis \leftarrow from to times narrower \leftarrow coeff.

 $d. d = 0.05s^2 + 1.1s$ from constant > c=0 > y-in+(0,0) from coeff > 0=0.05 = 5 = 100 = 20