Algebra 1 Support — Unit 5: Graphs and Characteristics of Quadratic Functions — Practice

Day 10 – Comparing Quadratic Functions
Practice Assignment

Name: Key **Date:** _____ **Block:** _____

Directions: Answer the following questions to comparing quadratic functions.

1. Which quadratic function has the bigger y-intercept? Explain why.

a. $y = -x^2 + 3x + 8$

y-int (0,8)

b.

x	-4	-3	-2	-1	0	1
y	9	13	19	13	9	7

y-int (0,9)

The table has the larger y-intercept because $9 > 8$.

2. Which quadratic function has the smallest y-intercept? Explain why.

a. $y = x^2 + 4x - 12$

y-int (0,-12)

b. $y = (x + 3)(x - 3)$

$y = x^2 - 3x + 3x - 9$

$y = x^2 - 9$

y-int (0,-9)

c. $y = (x + 2)^2 - 13$

$y = (x+2)(x+2) - 13$

$y = x^2 + 2x + 2x + 4 - 13$

$y = x^2 + 4x - 9$

y-int (0,-9)

Part A has the smallest y-intercept because $-12 < -9$.

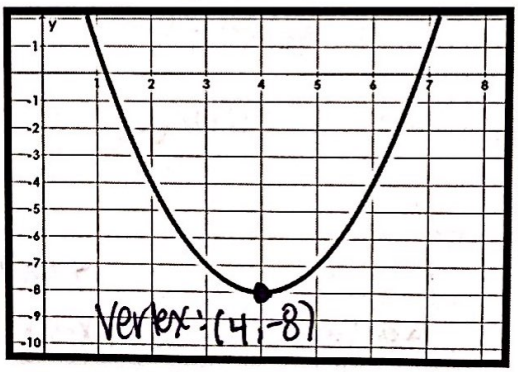
3. Which quadratic function has the ~~largest maximum~~ vertex lower minimum value? Explain why.

a.

x	-4	-3	-2	-1	0	1
y	0	-5	-8	-9	-8	-5

Vertex (-1,-9)

b.



The table has the lower minimum value.

4. Which quadratic function has the ~~lesser~~ bigger minimum vertex value? Explain why.

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

Vertex: (-4,2)

b. $y = (x + 3)(x + 1)$ (-3,0) (-1,0)

$x = \frac{p+q}{2} = \frac{-3+-1}{2} = \frac{-4}{2} = -2$

$y = (-2+3)(-2+1)$

$y = -1$

Vertex (-2,-1)

c.

x	2	3	4	5	6
y	0	-1	0	3	8

Vertex (3,-1)

Part A has the bigger minimum value at $y = 2$.

wo seagulls dive into the ocean. The given functions represent the height of each seagull above the face of the ocean as a function of the seagull's horizontal distance from a center buoy. For each set of nctions, **determine which bird descends deeper into the ocean**. Support your answer with facts (work).

a. Vertex

First Seagull: $f(x) = 3(x-2)^2 - 5$ V (2, -5)

Second Seagull: $g(x) = \{(-8,0), (-6,-4), (-4,0)\}$ V (-6, -4)

First seagull went deeper because $-5 < -4$.

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b. $x = \frac{-b}{2a} = \frac{12}{2(3)} = \frac{12}{6} = 2$ $y = 3(2)^2 - 12(2) + 7 = -5$

First Seagull: $f(x) = 3x^2 - 12x + 7$ V (2, -5)

Second Seagull: $g(x) = \frac{1}{2}(x+2)^2 - 6$ V (-2, -6)

The second seagull went deeper because $-6 < -5$.

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c. $x = \frac{-b}{2a} = \frac{8}{2(2)} = \frac{8}{4} = 2$ $y = 2(2)^2 - 8(2) + 11 = 3$

First Seagull: $f(x) = 2x^2 - 8x + 11$ V (2, 3)

Second Seagull:

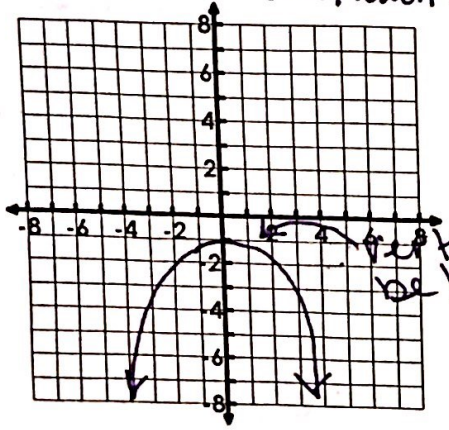
x	-3	-1	1	3	5
g(x)	11	6	3	2	3

V (3, 2)

The second seagull went deeper because $2 < 3$.

6. Which function has the lesser maximum value? Why?

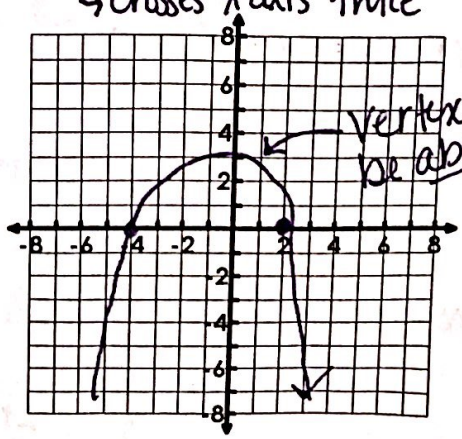
A. Parabola with no x-intercepts and a < 0? ↳ doesn't cross/touch x-axis ↗ down



vertex has to be below x-axis

OR

B. Parabola with two x-intercepts and a < 0? ↳ crosses x-axis twice ↗ down



vertex has to be above x-axis.

Use the graphs to help explain your answer.

Parabola A can't touch the x-axis, therefore its max value has to be below the x-axis. Parabola B has 2 x-intercepts and opens down, so its max value has to be above the x-axis. Therefore Parabola A has to have the smaller maximum value ↗ and opens down