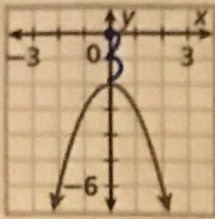


Unit 8 - Quadratic Functions

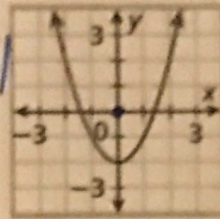
Learning Target #1: Transformations and Characteristics of Quadratic Functions

1) Which of the following is the graph of $f(x) = -x^2 + 2$.

~~(a)~~
down
2



a is (-) → reflection/
opens down



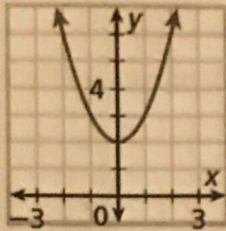
Parent Function:
 $f(x) = x^2$

Vertex Form:

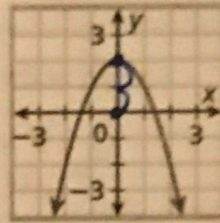
$$f(x) = a(x-h)^2 + k$$

a: shrink/stretch;
Reflection if (-)
h: right/left (opp)
k: up/down

~~(c)~~



k is +2 → up 2



2) How would you shift the parent function $y = x^2$ to the graph of $y = (x + 4)^2 + 5$

- ~~(a)~~ The parent function would shift 4 units left and 5 units down.
~~(b)~~ The parent function would shift 4 units right and 5 units up.
 (c) The parent function would shift 4 units left and 5 units up.
~~(d)~~ The parent function would shift 5 units right and 4 units down.

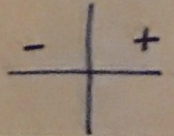
h is +4 → left 4

k is +5 → up 5

3) $f(x) = a(x-h)^2 + k$
 The parent function, $f(x) = x^2$, is reflected across the x-axis, stretched by a factor of 3, and shifted right 10 units and up 4 units to create $g(x)$. Use the description to write the quadratic function in vertex form.

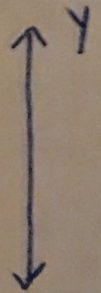
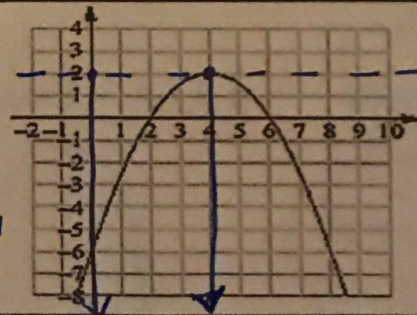
- ~~(a)~~ $g(x) = 3(x + 10)^2 + 4$
~~(c)~~ $g(x) = 3(x - 10)^2 + 4$

- (b) $g(x) = -3(x - 10)^2 + 4$
 (d) $g(x) = -3(x - 4)^2 + 10$



4) What is the range of the function to the right?

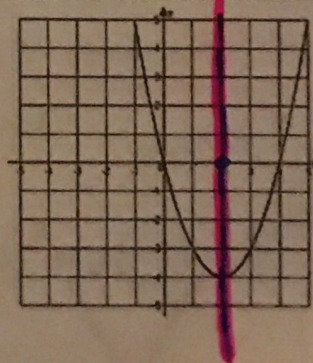
- (a) $y \leq 2$
~~(b)~~ $y \leq 4$
~~(c)~~ $y \geq 2$
~~(d)~~ All real numbers → Domain
- $y \leq 2$



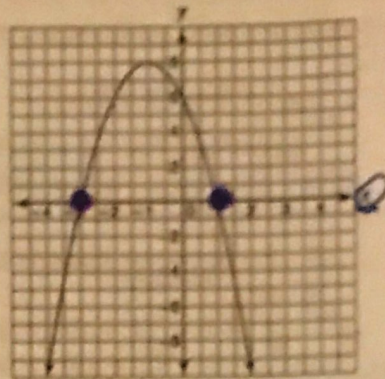
5) What is the axis of symmetry of the function to the right?

- ~~(a)~~ $y = 2$
 (b) $x = 2$
~~(c)~~ $y = -4$
~~(d)~~ $x = -4$

$x = 2$

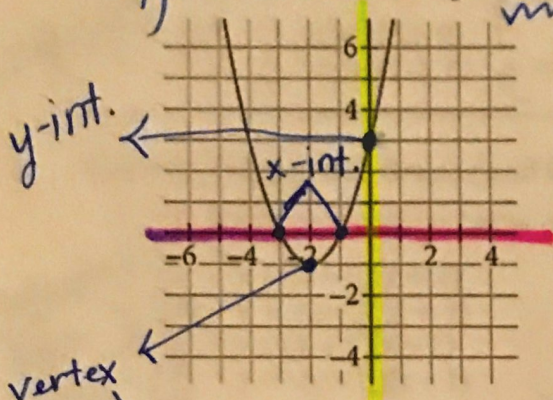


b) The graph of a quadratic equation is shown on the right. What are the zeroes of the equation?



- (a) $x = -3$ only (c) $x = 1$ only
 (b) $x = -3$ and $x = 1$ (d) $x = 3$ and $x = -1$

7) Which of the following is NOT true of the graph of the function below?



- (a) Its vertex is at $(-2, -1)$. ✓
 (b) Its y-intercept is at $(0, 3)$. ✓ where graph crosses y-axis
 (c) Its x-intercepts are $(-3, 0)$ and $(-1, 0)$. ✓ where graph crosses x-axis
 (d) Its minimum value is $y = -2$. X
 y-value of vertex $\rightarrow y = -1$

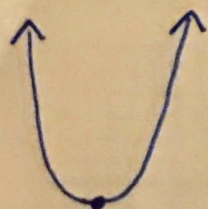
8) Describe the extrema for the quadratic equation: $y = -x^2 - 6x - 10$. Minimum or Maximum?

- (a) Minimum $a = -1$ (b) Maximum

9) From Question #13, describe the value of the extrema for the quadratic equation: $y = -x^2 - 6x - 10$

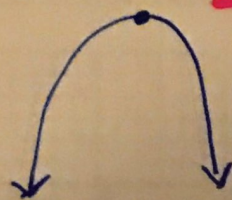
- (a) Maximum at $y = -1$ (b) Maximum at $x = -1$
 (c) Maximum at $y = -19$ (d) Maximum at $x = -19$

standard form



UP - MINIMUM
 a is positive

DOWN - MAX



a is negative

negatives

negative

$$y = -(-3)^2 - 6(-3) - 10$$

$$y = -1$$

minus / subtraction

$$y = Ax^2 + Bx + C$$

Find vertex:

1) Find AOS:
 $x = \frac{-b}{2a} = \frac{-(-6)}{2(-1)}$
 $= \frac{+6}{-2}$
 $x = -3$

2) Find $f(-3)$

$$x = (-3)^2$$