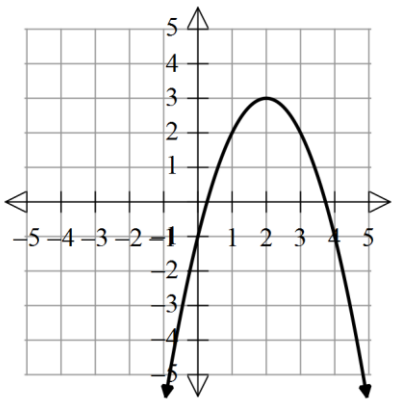
Algebra I Unit 7: Graphing Nonlinear Functions

1. Over what interval is the following quadratic function decreasing?



(A) Between $-\infty$ and 2
(B) Between 2 and $+\infty$
(C) Between $-\infty$ and $+\infty$
(D) Between $-\infty$ and 3

2. What are the roots of the quadratic equation $10x^2 - 18x - 4 = 0$?

(A) $-\frac{1}{5}$ and 2
(B) $\frac{1}{5}$ and -2
(C) -1 and $\frac{2}{5}$
(D) 1 and $-\frac{2}{5}$

3. You graciously agree to toss a piece of candy to your sister who is sitting 6 feet away. The candy, at its highest point in the toss, was 4 feet off the ground. Which of the following equations could be used to model the trajectory of your flying candy?

(A) $y = -0.5(x + 6)^2 + 4$
(B) $y = -0.5(x - 3)^2 + 4$
(C) $y = -0.5(x - 6)^2 + 4$
(D) $y = -0.5(x + 3)^2 + 4$

4. What is the vertex of the quadratic function $y = x^2 - 4x + 5$?

(A) $(2, 13)$
(B) $(-2, 3)$
(C) $(-4, 5)$
(D) $(2, 1)$

5. Given the equation $y = x^2 + 5x - 3$, what is the axis of symmetry for the graph of the parabola?

(A) $x = 5$
(B) $x = 3$
(C) $x = -\frac{5}{2}$
(D) $x = \frac{5}{2}$

6. What is the domain and range of the function $y = 3x^2 - 6x + 1$?

(A) Domain: $x \geq 0$, Range: $y \geq 0$
(B) Domain: $x \geq 0$, Range: $y \geq 1$
(C) Domain: all real numbers, Range: $y \geq 0$
(D) Domain: all real numbers, Range: $y \geq -2$

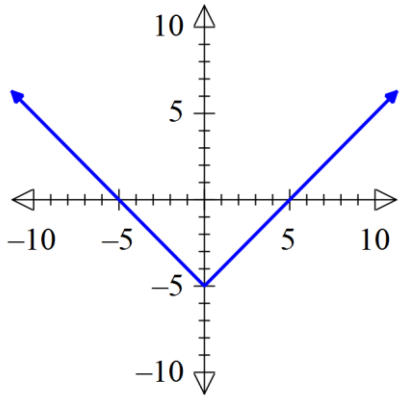
7. A toy rocket that is launched from ground level with an initial velocity of 128 ft/sec is represented by the equation $h = -16t^2 + 128t$. Which of the following does **not** describe the graph?

(A) Parabola opening up with a vertex at $(4, 256)$
(B) y-intercept at 0
(C) x-intercepts at 0 and 8
(D) Parabola opening down, reaching its highest value in 4 seconds

8. What type of function is $f(x) = -2x(x - 1) + 7$ and what does the end behavior of the graph look like?

(A) Linear, down to the left, up to the right
(B) Quadratic, up to the left, up to the right
(C) Quadratic, down to the left, down to the right
(D) Linear, up to the left, down to the right

9. Which statement is true about the function shown in the graph below and $y = 3x - 5$?



(A) They have the same x-intercept.
(B) They have the same y-intercept.
(C) Both functions are increasing over the interval $-\infty$ to ∞.
(D) Both functions are decreasing over the interval $-\infty$ to ∞.

10. Which of the following are four different ordered pairs that are on the graph of $y = 3|x + 1| - 5$?

(A) $(-2, -8)$, $(-1, -5)$, $(0, -2)$, $(1, -1)$
(B) $(-2, -2)$, $(-1, -5)$, $(0, -2)$, $(1, 1)$
(C) $(-2, 1)$, $(-1, -2)$, $(0, -8)$, $(1, 1)$
(D) $(-2, -2)$, $(-1, 5)$, $(0, 2)$, $(1, -1)$

11. When the function $y = x^2$ is changed to $y = (x + 3)^2 - 1$, what type of transformation is applied to the graph?

(A) Right 3, down 1
(B) Right 3, up 1
(C) Left 3, down 1
(D) Left 3, up 1

12. When the function $y = |x + 4|$ is changed to $y = \frac{1}{2}|x + 4|$, how will the graph of the function change?

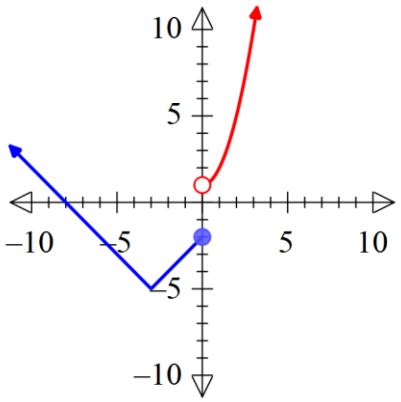
(A) It will compress in the x direction.
(B) It will stretch in the x direction.
(C) It will compress in the y direction.
(D) It will stretch in the y direction.

13. According to this piecewise-defined function, what is the value of $f(x)$ when $x = 1$?

$$f(x) = \begin{cases} x^2 & if\ x < 1 \\ 2x - 3 & if\ x \geq 1 \end{cases}$$

(A) -1
(B) 0
(C) 1
(D) None of the above

14. Which piecewise-defined function matches the graph below?



(A) $f(x) = \begin{cases} |x-3|-5 & if\ x \le 0 \\ x^2+1 & if\ x \ge 0 \end{cases}$

(B) $f(x) = \begin{cases} |x+3|-5 & if\ x \le 0 \\ x^2+1 & if\ x \ge 0 \end{cases}$

(C) $f(x) = \begin{cases} |x-3|-5 & if\ x \le 0 \\ x^2+1 & if\ x > 0 \end{cases}$

(D) $f(x) = \begin{cases} |x+3|-5 & if\ x \le 0 \\ x^2+1 & if\ x > 0 \end{cases}$

15. What are the domain and range of this function?

$$f(x) = \begin{cases} 2 & if\ -6 \le x < -4 \\ 3 & if\ -4 \le x < -2 \\ 4 & if\ -2 \le x < 0 \\ 5 & if\ 0 \le x < 2 \\ 6 & if\ 2 \le x < 4 \end{cases}$$

(A) Domain: $-6 \le x \le 4$, Range: $\{2, 3, 4, 5, 6\}$
(B) Domain: $\{2, 3, 4, 5, 6\}$, Range: $-6 \le x < 4$
(C) Domain: $\{-6, -4, -2, 0, 2\}$, Range: $\{2, 3, 4, 5, 6\}$
(D) Domain: $-6 \le x < 4$, Range: $\{2, 3, 4, 5, 6\}$

16. Using a graphing calculator, find the maximum of the function $-3x^2 + 6x - 1$.

(A) $(1, 2)$
(B) $(-1, 2)$
(C) $(1, -2)$
(D) $(0, -1)$

17. The county fair charges a $20.00 entry fee and an additional $2.00 for each ride. What is the limit on the domain of this function?

(A) $x \leq 0$
(B) $x < 0$
(C) $x \geq 0$
(D) $x > 0$