

Name _____

Quadratics Introduction Quiz

Date _____

Honors Algebra 2

$$f(x) = ax^2 + bx + c$$

1) Use the information below to write, describe, and graph the quadratic function.

a) Write the quadratic function that fits the points $(-2, 5)$, $(0, -3)$, and $(3, 0)$.

$$\begin{aligned} 5 &= a(-2)^2 + b(-2) + c \rightarrow 5 = 4a - 2b + c \\ -3 &= a(0)^2 + b(0) + c \rightarrow c = -3 \\ 0 &= a(3)^2 + b(3) + c \rightarrow 0 = 9a + 3b + c \end{aligned}$$

$$5 = 4a - 2b - 3$$

$$0 = 9a + 3b - 3$$

$$\boxed{8 = 4a - 2b}$$

$$\boxed{3 = 9a + 3b}$$

$$8 = 4a - 2b \rightarrow 3(8 = 4a - 2b)$$

$$3 = 9a + 3b \rightarrow 2(3 = 9a + 3b)$$

↓

$$24 = 12a - 6b$$

$$6 = 18a + 6b$$

$$30 = 30a$$

$$\boxed{a = 1}$$

$$3 = 9(1) + 3b$$

$$3 = 9 + 3b$$

$$-6 = 3b$$

$$\boxed{b = -2}$$

$$\boxed{f(x) = x^2 - 2x - 3}$$

b) Describe the quadratic.

$$\frac{-(-2)}{2(1)} = \frac{2}{2} = 1 \quad \text{Axis of Symmetry } \underline{x = 1}$$

$$\text{Vertex } \underline{(1, -4)}$$

$$\text{Y-Intercept } \underline{(0, -3)}$$

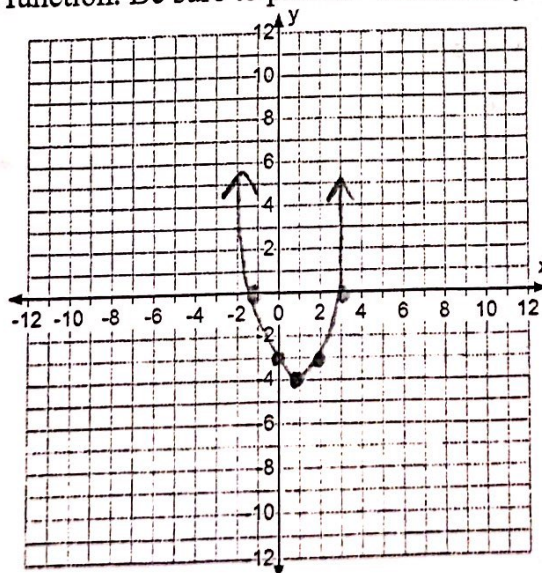
$$\text{Opens Up or Down } \underline{\text{Up}}$$

c) Determine the Max or Min of the quadratic. Then, find the domain and range in interval notation. Since the quadratic opens up, the vertex will be a

minimum. Minimum = $(1, -4)$

$$\text{Domain: } [-\infty, \infty], \text{ Range: } [-4, \infty]$$

d) Graph the given function. Be sure to plot the vertex and y-intercept clearly.



2) Use the information below to write, describe, and graph the quadratic function.

a) Write the quadratic function that fits the points $(-1, 8)$, $(0, 4)$, and $(2, 2)$.

$$\begin{aligned} (-1, 8) &\rightarrow 8 = a(-1)^2 + b(-1) + c \Rightarrow 8 = a - b + c \\ (0, 4) &\rightarrow 4 = a(0)^2 + b(0) + c \Rightarrow \boxed{4 = c} \\ (2, 2) &\rightarrow 2 = a(2)^2 + b(2) + c \Rightarrow 2 = 4a + 2b + c \end{aligned}$$

$$\begin{aligned} 8 &= a - b + 4 \\ \boxed{4 = a - b} & & 2 &= 4a + 2b + 4 \\ \boxed{-2 = 4a + 2b} & & & \end{aligned}$$

$$\begin{aligned} 4 &= a - b \Rightarrow 2(4 = a - b) \\ -2 &= 4a + 2b \end{aligned}$$

$$\begin{aligned} &\downarrow \\ 8 &= 2a - 2b \\ -2 &= 4a + 2b \end{aligned}$$

$$\begin{aligned} 6 &= 6a \\ \boxed{a = 1} \end{aligned}$$

$$4 = 1 - b \Rightarrow 3 = -b \Rightarrow \boxed{b = -3}$$

$$f(x) = x^2 - 3x + 4$$

b) Describe the quadratic.

Axis of Symmetry $x = \frac{3}{2}$

Vertex $(\frac{3}{2}, \frac{7}{4})$

Y-Intercept $(0, 4)$

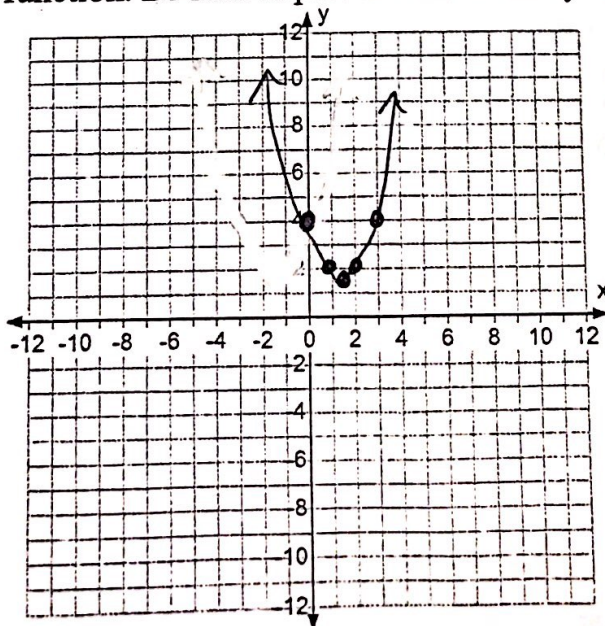
Opens Up or Down Up

c) Determine the Max or Min of the quadratic. Then, find the domain and range in interval notation. Since the quadratic opens up, the vertex is a minimum.

$$\text{Min} = (\frac{3}{2}, \frac{7}{4})$$

$$\text{Domain: } [-\infty, \infty] \quad \text{Range: } [\frac{7}{4}, \infty]$$

d) Graph the given function. Be sure to plot the vertex and y-intercept clearly.



3) Use the information below to write, describe, and graph the quadratic function.

a) Write the quadratic function that fits the points (2, 3), (6, 3), and (8, -3).

$$\begin{aligned} (2, 3) &\rightarrow 3 = a(2)^2 + b(2) + c \Rightarrow 3 = 4a + 2b + c \\ (6, 3) &\rightarrow 3 = a(6)^2 + b(6) + c \Rightarrow 3 = 36a + 6b + c \\ (8, -3) &\rightarrow -3 = a(8)^2 + b(8) + c \Rightarrow -3 = 64a + 8b + c \end{aligned}$$

$$\begin{aligned} -1(3 = 4a + 2b + c) &\Rightarrow -3 = -4a - 2b - c \\ 3 = 36a + 6b + c & \end{aligned}$$

$$\boxed{0 = 32a + 4b}$$

$$\begin{aligned} -1(3 = 4a + 2b + c) &\Rightarrow -3 = -4a - 2b - c \\ -3 = 64a + 8b + c & \Rightarrow -3 = 64a + 8b + c \end{aligned}$$

$$\boxed{-6 = 60a + 6b}$$

$$\begin{aligned} 3(0 = 32a + 4b) &\Rightarrow 0 = 96a + 12b \\ 2(-6 = 60a + 6b) &\Rightarrow -12 = 120a + 12b \\ \hline -12 &= 24a \end{aligned}$$

$$\boxed{a = -1/2}$$

$$0 = 32(-1/2) + 4b$$

$$0 = -16 + 4b$$

$$16 = 4b$$

$$\boxed{b = 4}$$

$$3 = 4(-1/2) + 2(4) + c$$

$$3 = -2 + 8 + c$$

$$3 = 6 + c$$

$$\boxed{-3 = c}$$

$$f(x) = -1/2x^2 + 4x - 3$$

b) Describe the quadratic.

$$\frac{-4}{2(-1/2)} = \frac{-4}{-1} = 4 \text{ Axis of Symmetry } \underline{x = 4}$$

$$\text{Vertex } \underline{(4, 5)}$$

$$\text{Y-Intercept } \underline{(0, -3)}$$

$$\text{Opens Up or Down } \underline{\text{Down}}$$

c) Determine the Max or Min of the quadratic. Then, find the domain and range in interval notation.

Since the quadratic opens down, the vertex is a maximum.

$$\text{Max} = (4, 5)$$

$$\text{Domain: } [-\infty, \infty] \quad \text{Range: } (-\infty, 5]$$

d) Graph the given function. Be sure to plot the vertex and y-intercept clearly.

