

W-AZ Algebra 2 Week 21

Quadratic Formula

$$f(x) = ax^{\textcircled{2}} + bx + c$$

Major Characteristics

- 1.) All exponents must be whole numbers.
No fractions, no decimals, no negatives in exponent
- 2.) Highest degree term must be 2

$$\frac{1}{x} = x^{-1}$$

$$\frac{3}{x} = 3x^{-1}$$

① FOIL (2, 1, 0)

$$f(x) = (x+4)(x-4)$$

$$x^2 - 4x + 4x - 16$$

$$x^{\textcircled{2}} - 16$$

quadratic

$$\boxed{ax^2} + bx \boxed{+c}$$

②

$$f(x) = x^2 + 5x + \frac{3}{x}$$

$$x^2 + 5x + 3x^{\textcircled{-1}}$$

not quadratic

③

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

$$2(x-2)(x-2) - 2x^2$$

④

$$f(x) = \frac{x^3 + 8x^2 - 16x}{x}$$

$$\frac{x^{\cancel{3}}}{x} + \frac{8x^{\cancel{2}}}{x} - \frac{16x}{x}$$

$$x^2 + 8x - 16$$

quadratic

(5)² = (5)(5)

$$2(x^2 - 2x - 2x + 4) - 2x^2$$

$$\{ \textcircled{2}(x^2 - 4x + 4) - 2x^2$$

$$\cancel{2x^2} - 8x + 8 - \cancel{2x^2}$$

$$-8x + 8$$

not quadratic

$x \neq 0$

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

$$\begin{matrix} (-1, 12) & (2, 3) & (3, 4) \\ \uparrow & \uparrow & \\ x & f(x) & \end{matrix}$$

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

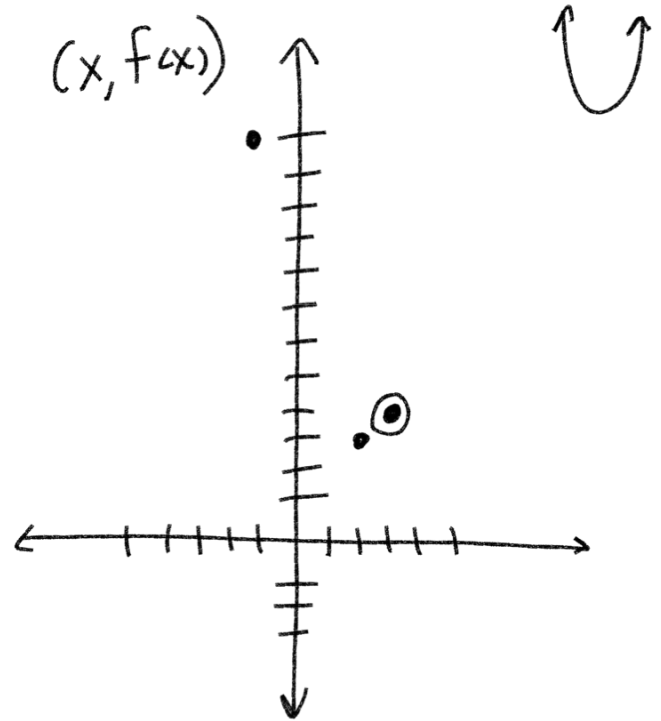
$$\underline{(-1, 12)}$$

$$12 = a(-1)^2 + b(-1) + c$$

$$\{ 12 = a - b + c \}$$

$$\begin{matrix} (2, 3) \\ (3, 3) \end{matrix} = a(2)^2 + b(2) + c$$

$$\{ 3 = 4a + 2b + c \}$$



$$\left[\begin{matrix} a - b + c = 12 \\ 4a + 2b + c = 3 \\ 9a + 3b + c = 4 \end{matrix} \right. \}$$

$$\begin{matrix} (3, 4) \\ \uparrow \\ x \end{matrix} \quad \begin{matrix} f(x) = ax^2 + bx + c \\ \downarrow \\ 4 = a(3)^2 + b(3) + c \\ 4 = 9a + 3b + c \end{matrix}$$

$$9a + 3b + c = 4$$

$$-(a - b + c = 12)$$

$$\hline 9a + 3b + c = 4$$

$$-a + b - c = -12$$

$$\frac{8a}{4} + \frac{4b}{4} = \frac{-8}{4}$$

$$2a + b = -2$$

$$4a + 2b + c = 3$$

$$-(a - b + c = 12)$$

$$4a + 2b + c = 3$$

$$-a + b - c = -12$$

$$\frac{3a}{3} + \frac{3b}{3} = \frac{-9}{3}$$

$$a + b = -3$$

$$2a + b = -2$$

$$-(a + b = -3)$$

$$\hline 2a + b = -2$$

$$-a - b = 3$$

$$\hline a = 1$$

$$a = 1$$

$$a + b = -3$$
$$1 + b = -3$$
$$-1 \quad -1$$

$$b = -4$$

$$a - b + c = 12$$

$$1 - (-4) + c = 12$$

$$1 + 4 + c = 12$$

$$5 + c = 12$$
$$-5 \quad -5$$

$$c = 7$$

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

$$f(x) = x^2 - 4x + 7$$

5-2 Properties of Parabolas

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

$$f(x) = 2x^2 - 8x + 5$$

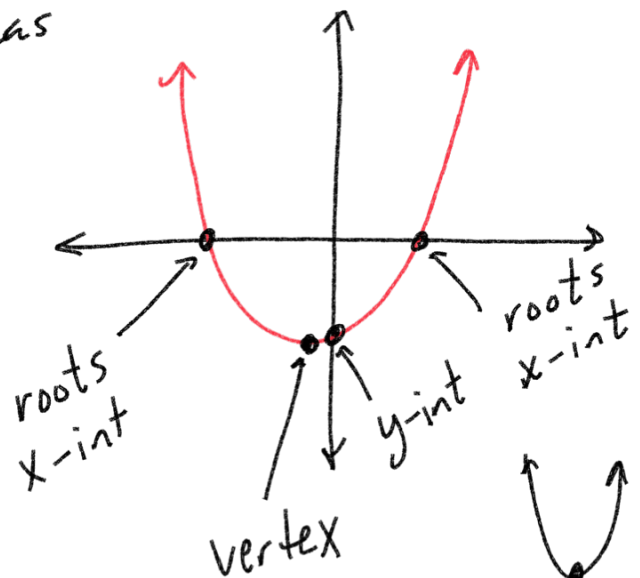
vertex:

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right)$$

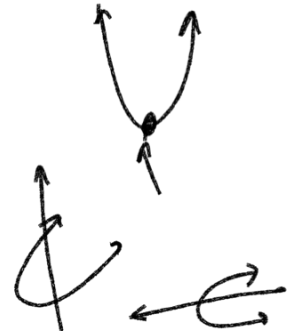
$$a = 2 \quad b = -8 \quad c = 5$$

$$\frac{-(-8)}{2(2)} = \frac{8}{4} = 2$$

$$f(2) = 2(2)^2 - 8(2) + 5$$
$$2(4) - 8(2) + 5$$
$$8 - 16 + 5$$
$$-8 + 5 = -3$$



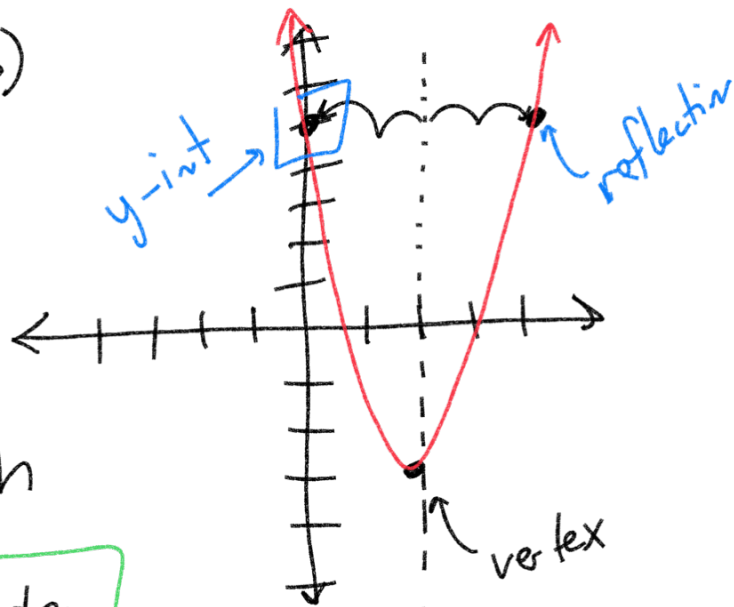
$$\text{vertex: } (2, -3)$$



vertex: (2, -3)

$$f(x) = +2x^2 - 8x + 5$$

\uparrow \uparrow
 \oplus \ominus \oplus
 y-int



line of symmetry $x = h$

line of symmetry $x = 2$

\downarrow
 $f(x) = +x^2 - 4x + 7$

\uparrow \uparrow
 y-int input $(2, 3)$

vertex $\left(\frac{-b}{2a}, f(x) \right)$

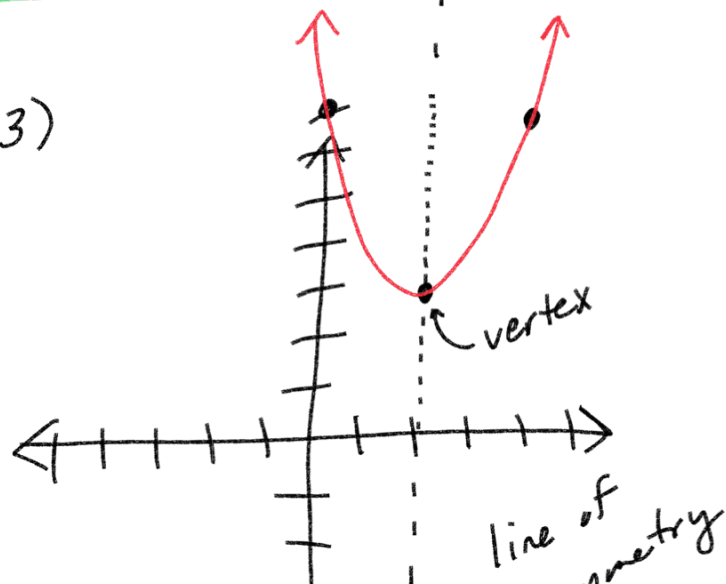
$$\frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$$

$$f(2) = (2)^2 - 4(2) + 7$$

$$4 - 8 + 7$$

$$-4 + 7 = 3$$

$a = 1$
 $b = -4$
 $c = 7$



HW
 Ch 5.2 avens
 supplemental WS
 Online 2/3 due March 10th
 HW/quiz 20 due March 4th
 Test 3 due ASAP

