

TH-AZ Algebra 2 Week 20

$f(x) = ax^2 + bx + c$
 $y = x^2 - 4x + 1$ ← y-int
 $a = 1$ $b = -4$ $c = 1$

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

vertex:

$(2, -3)$

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

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

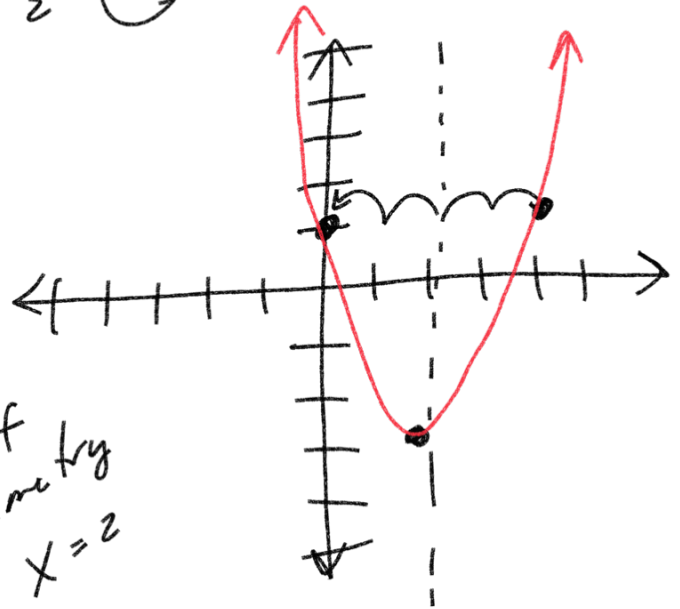
$f(2) = (2)^2 - 4(2) + 1$

$4 - 8 + 1$

$-4 + 1$

-3

line of symmetry
 $x = 2$



↙ down ↘
 $y = -3x^2 + 12x - 8$

$(2, 4)$

vertex; graph $a = -3$ $b = 12$ $c = -8$

$X = \frac{-b}{2a} = \frac{-12}{2(-3)} = \frac{-12}{-6} = 2$

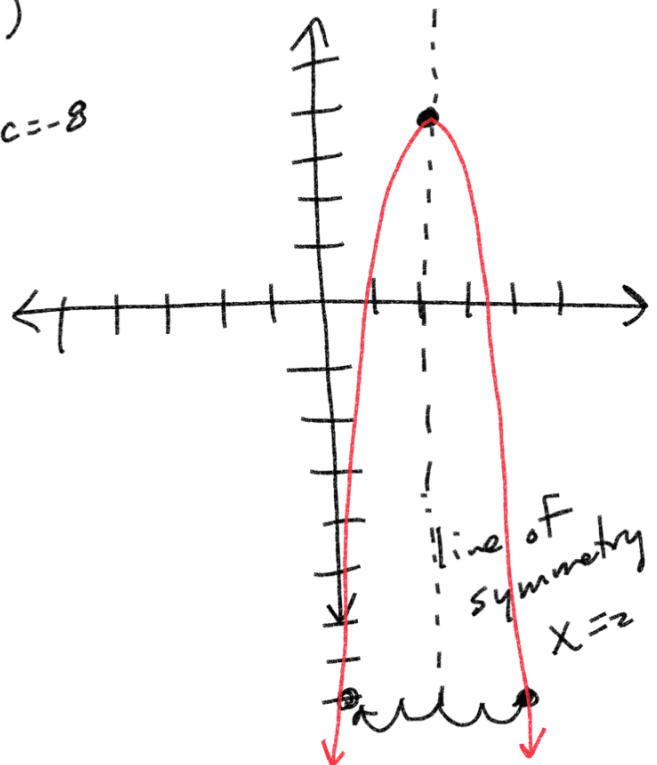
$-3(2)^2 + 12(2) - 8$

$-3(4) + 12(2) - 8$

$-12 + 24 - 8$

$12 - 8$

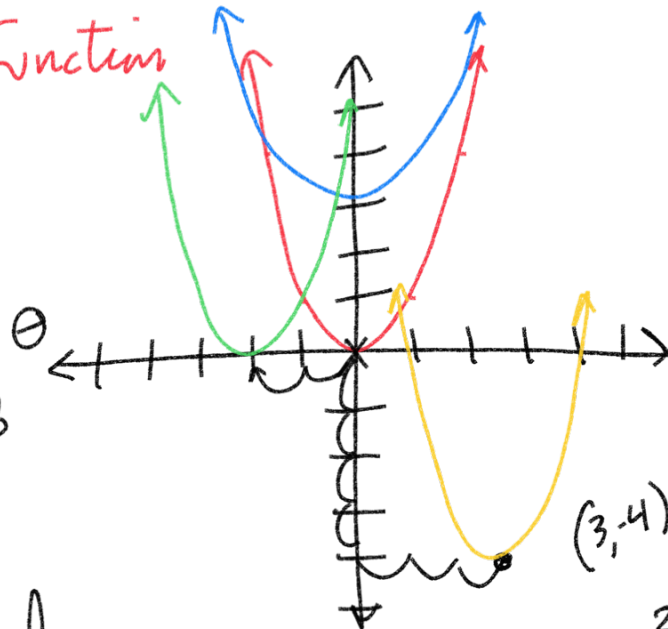
(4)



$y = x^2$ parent function

$y = x^2 + 3$

vertical shift up 3



$y = (x + 2)^2$
 opposite horizontal shift left 2

$y = (x - 3)^2 - 4$
 right down 4

vertex form

$y = a(x - h)^2 + k$
 vertex (h, k)
 slope a
 opposite sign

$y = \left(\frac{3}{3}x - \frac{12}{3}\right)^2 + 2$

$a > 1$
 $0 < a < 1$

stretched vertically
 stretched horizontally

$y = 3(x - 4)^2 + 2$
 slope \nearrow
 vertex $(4, 2)$

vertex $(4, 2)$

$$\left(\frac{2}{2}x + \frac{3}{2}\right)^2 + 2$$

$$(-1.5, 2)$$

slope $\left(2\left(x + \frac{3}{2}\right)\right)^2 + 2$ vertex $\left(-\frac{3}{2}, 2\right)$

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

opposite

$$y = \left(\frac{4}{4}x + \frac{8}{4}\right)^2 - 7$$

$$\text{vertex: } (-2, -7)$$

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

$$y = \left(\frac{\frac{1}{2}x}{\frac{1}{2}} - \frac{4}{\frac{1}{2}}\right)^2 + 3$$

vertex:

$$\frac{-4}{\frac{1}{2}} \div \frac{1}{2}$$

$$\frac{-4}{\frac{1}{2}} * \frac{2}{1} = \frac{-8}{1} = -8$$

$$y = \left(\frac{1}{2}(x+8)\right)^2 + 3$$

$$\text{vertex: } (8, 3)$$

vertex form

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

vertex (h, k)

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

Completing the Square

quadratic form

$$y = ax^2 + bx + c$$

vertex form: $y = a(x-h)^2 + k$
vertex (h, k)

$$a = 1 \quad b = -2 \quad c = -3$$

$$\{ y = x^2 - 2x - 3 \}$$

vertex?

Step 1: Separate x terms

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

Step 2: Factor out a term

$$\left(\frac{1}{1}x^2 - 2x \right) - 3$$

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

Step 3: $\left(\frac{b}{2}\right)^2 = \left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$

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

$$x^2 - 2x + 1 = (x-1)^2$$

$$(x-1)^2 = (x-1)(x-1)$$

$$x^2 - x - x + 1$$

Step 4:

$$y = (x-1)^2 - 4$$

vertex form

vertex: $(1, -4)$

$$x^2 - 2x + 1$$

$$y = x^2 + 4x + 6 \leftarrow$$

$$(x^2 + 4x) + 6$$

$$\left(\frac{b}{2}\right)^2$$

$$\left(\frac{4}{2}\right)^2$$

$$(2)^2 = 4$$

$$(x^2 + 4x + 4) + 6 - 4$$

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

$$(x + 2)^2 + 2$$

opposite

vertex: $(-2, 2)$

$$y = 4x^2 + 8x - 3$$

$$y = \left(\frac{4x^2 + 8x}{4}\right) - 3$$

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

$$4(x^2 + 2x + 1) - 3 - 4$$

$$4(x + 1)^2 - 7$$

Other method

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

$$-\frac{8}{2(4)} = -\frac{8}{8} = -1$$

$$-1(4)$$

$$\downarrow$$

$$-4$$

vertex $(-1, -7)$

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

$$y = 4(x + 1)^2 - 7$$

$$\left(\frac{b}{2}\right)^2$$

$$\left(\frac{2}{2}\right)^2$$

$$(1)^2 = 1$$

HW

Ch 5.3 events

Supplemental WS

Online HW 203

Quiz 203

Feb 25th

HW/Q 18 due

Feb 14th

HW/Q 19 due

Feb 22nd