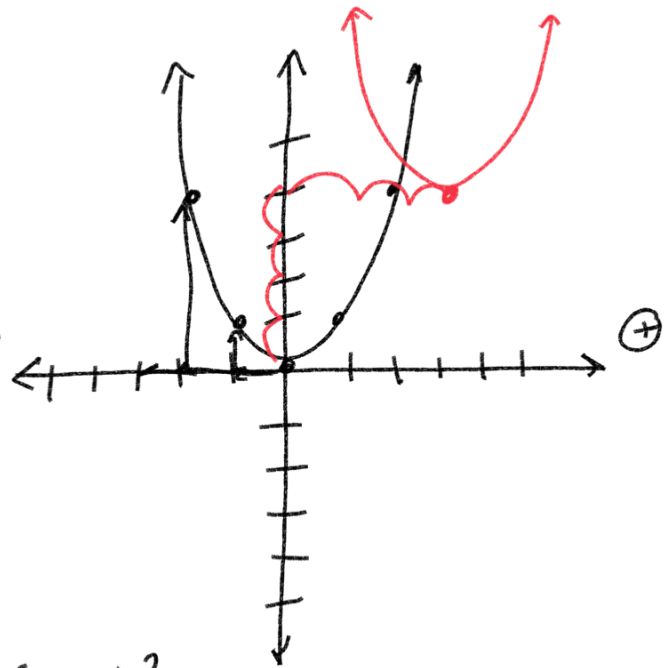


$$y = (x - 3)^2 + 4$$

$y = x^2$ (boxed)
 3 right ↑
 up 4 ↑

Vertex: $(3, 4)$ ⊖



Vertex form

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

$$y = (x - 0)^2 + 0$$

vertex: $(0, 0)$

$$y = \left(\frac{4}{4}x + \frac{24}{4}\right)^2 - 2$$

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

↑ slope = 4 vertex $(-6, -2)$

↑
vertical stretch

Completing the Square

quadratic form

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

vertex form

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

by completing the square

$$y = x^2 + 8x - 12$$

$$y = (x^2 + 8x) - 12$$

\uparrow \uparrow
 $+16$ -16

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

$$y = (x^2 + 8x + 16) - 12 - 16$$

$$\left(\frac{-8}{2}\right)^2$$

$$y = (x^2 + 8x + 16) - 28$$

$$(-4)^2 = 16$$

$$y = (x - 4)^2 - 28$$

vertex form

vertex: $(4, -28)$

Step 1 Quarantine x's

Step 2 Factor out the x^2 coefficient (a term)

Step 3 $\left(\frac{b}{2}\right)^2 \rightarrow$ add inside and subtract outside

Step 4 Square rooting

$$y = -2x^2 + 12x - 8$$

$$\rightarrow \left(\frac{-2x^2 + 12x}{-2} \right) - 8$$

$$\textcircled{-2}(x^2 - 6x) - 8$$

\uparrow \uparrow
 $+9$ $-9(-2)$

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

$$(-3)^2 = 9$$

$$-2(x^2 - 6x + 9) - 8 + 18$$

$\sqrt{x^2}$ $\sqrt{9}$
 $-2(x-3)^2 + 10$

Vertex: (3, 10)

- Step 1 Quantine x's ✓
- Step 2 Factor out the x^2 coefficient (a term) ✓
- Step 3 $\left(\frac{b}{2}\right)^2 \rightarrow$ add inside and subtract outside ✓
- Step 4 Square rooting ✓

$$y = 3x^2 + 6x - 12$$

$$y = (3x^2 + 6x) - 12$$

$$y = \textcircled{3}(x^2 + 2x) - 12$$

\uparrow \uparrow
 $+1$ $-1(3)$

$$\left(\frac{2}{2}\right)^2 = 1$$

$$3(x^2 + 2x + 1) - 12 - 3$$

$$3(x^2 + 2x + 1) - 15$$

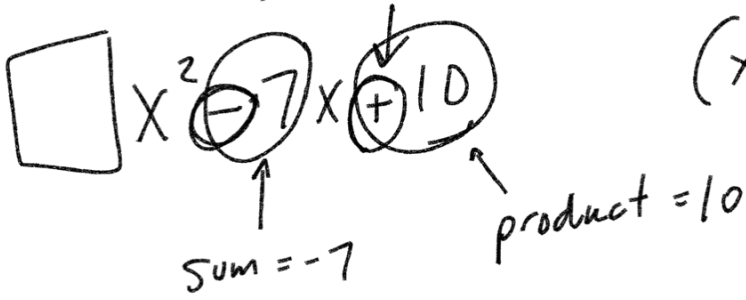
$$3(x+1)^2 - 15$$

$y = 3(x+1)^2 - 15$

5-4 Factoring Quadratics

+ → same - different

UNFOILING



$$(x \pm _)(x \pm _)$$

$$(x-5)(x-2)$$

$$\underline{-5} + \underline{-2} = -7$$

$$\underline{-5} * \underline{-2} = 10$$

$$x^2 - 7x + 10 = 0$$

↓

$$(x-5)(x-2) = 0$$

$$\begin{array}{l} x-5=0 \\ +5 \quad +5 \end{array} \qquad \begin{array}{l} x-2=0 \\ +2 \quad +2 \end{array}$$

$$\underline{x=5} \qquad \underline{x=2}$$

$$x^2 + 3x - 10 = 0$$

↓

$$\underline{-2} + \underline{5} = 3$$

$$\underline{-2} * \underline{5} = -10$$

$$(x-2)(x+5) = 0$$

$$\begin{array}{l} x-2=0 \\ +2 \quad +2 \end{array} \qquad \begin{array}{l} x+5=0 \\ -5 \quad -5 \end{array}$$

$$\underline{x=2} \qquad \underline{x=-5}$$

$$x^2 + 13x + 36 = 0$$

$$\underline{9} + \underline{4} = 13$$

$$\underline{9} * \underline{4} = 36$$

$$(x+9)(x+4) = 0$$

$$x+9=0$$

$$-9 \quad -9$$

$$x = -9$$

$$x+4=0$$

$$-4 \quad -4$$

$$x = -4$$

$$x^2 + 7x - 30 = 0$$

$$\underline{10} + \underline{-3} = 7$$

$$\underline{10} * \underline{-3} = -30$$

$$6 * 5$$

✓
$$6 - 5$$

$$3 * 10$$

✓
$$10 - 3$$

$$(7)$$

$$1 * 30$$

✓
$$30 - 1$$

$$(x+10)(x-3) = 0$$

$$x+10=0$$

$$-10 \quad -10$$

$$x-3=0$$

$$+3 \quad +3$$

$$x = -10 \quad x = 3$$

$$(-10, 3)$$

Difference of Squares

$$x^2 - 64$$

↑ perfect square ↑ perfect square

$$\sqrt{x^2} \quad x^2 = 64 \quad \sqrt{64}$$

$$x \pm 8$$

$$(x+8)(x-8)$$

$$\textcircled{2} \frac{x^2}{2} - \frac{10x}{2} - \frac{28}{2} = 0$$

Factor out the "a" term

$$2(x^2 - 5x - 14) = 0$$

$$\underline{-7} + \underline{2} = -5$$

$$\underline{-7} * \underline{2} = -14$$

$$2(x-7)(x+2) = 0$$

$$x-7=0$$

$$+7 \quad +7$$

$$x+2=0$$

$$-2 \quad -2$$

$$x=7$$

$$x=-2$$

$$7 * -2 \quad -7 * 2$$

$$\frac{x^2}{x} + \frac{11x}{x} = 0$$

$$(x)(x+11) = 0$$

$$x=0$$

$$x+11=0$$

$$-11 \quad -11$$

$$x=0$$

$$x=-11$$

$$\textcircled{0, -11}$$

$$x^2 + 4x - 20 = 1$$

-1 -1

$$x^2 + 4x - 21 = 0$$

$$(x+7)(x-3) = 0$$

$$x+7=0$$

-7 -7

$$x = -7$$

$$x-3=0$$

+3 +3

$$x = 3$$

in order to solve, = 0

$$\frac{7}{-1} + \frac{-3}{-1} = \frac{4}{-1}$$

$$\frac{7}{-1} * \frac{-3}{-1} = \frac{-21}{-1}$$

HW
ch 5-4 evens
5-5 evens
* Supplemental WS
Online HW 22-3 March 11th
Quiz 22-3
HW/Quiz 20 due March 2nd