M-A2 Algebra 2 Week 23 3/11

Which of the following is a quadratic?

1.) $x^2 - 8x + 15 = y$ Yaw!

2.) $3x - 6 = y$ Naw!

3.) $2(x^2 + 5x - 8) - 2x^2 = y$

$\cancel{2x^2} + 10x - 16 \cancel{- 2x^2} = y$

$10x - 16 = y$ Naw.

4.) $x^3 + 5x^2 - 2x + 12 = y$ Naw!

5.) $(x-3)(x+6) = y$ FOIL

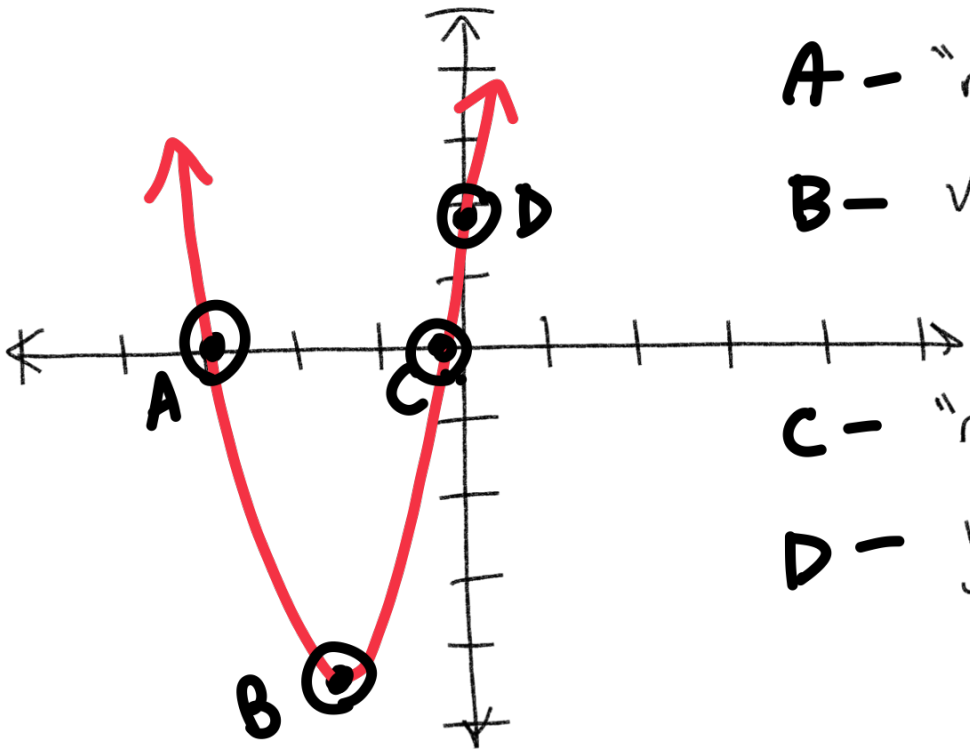
$x^2 + 6x - 3x - 18$

$x^2 + 3x - 18 = y$ Yaw!

Quadratic

1.) Highest degree exponent is two. x^2

2.) Exponents must be whole numbers. No negatives or fractions as exponents.



A – "root" or "zero"

B – vertex

C – "root" or "zero"

D – y-intercept

Find the quadratic equation for the line with the points: $(-1,10)$, $(2,4)$, $(3,-6)$

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

x y

$(-1,10)$

$y = ax^2 + bx + c$

$10 = a(-1)^2 + b(-1) + c$

$10 = a - b + c$

$(2,4)$

$y = ax^2 + bx + c$

$4 = a(2)^2 + b(2) + c$

$4 = 4a + 2b + c$

$(3,-6)$

$y = ax^2 + bx + c$

$-6 = a(3)^2 + b(3) + c$

$-6 = 9a + 3b + c$

① $10 = a - b + c$

② $4 = 4a + 2b + c$

③ $-6 = 9a + 3b + c$

② $4 = 4a + 2b + c$

① $-(10 = a - b + c)$

$$\begin{array}{rl} & 4 = 4a + 2b + \cancel{c} \\ + & -10 = -a + b - \cancel{c} \\ \hline & -6 = 3a + 3b \\ & \frac{-6}{3} = \frac{3a}{3} + \frac{3b}{3} \end{array}$$

③ $-6 = 9a + 3b + c$

① $-(10 = a - b + c)$

$$\begin{array}{rl} & -6 = 9a + 3b + \cancel{c} \\ & -10 = -a + b - \cancel{c} \\ \hline & -16 = 8a + 4b \\ & \frac{-16}{4} = \frac{8a}{4} + \frac{4b}{4} \end{array}$$

④ $-2 = a + b$

⑤ $-4 = 2a + b$

④ $-2 = a + b$

⑤ $-(-4 = 2a + b)$

$$\begin{array}{rl} & -2 = a + \cancel{b} \\ & 4 = -2a - \cancel{b} \\ \hline & \frac{2}{-1} = \frac{-a}{-1} \\ & \boxed{-2 = a} \end{array}$$

④ $-2 = a + b$

$-2 = -2 + b$

$+2 \quad +2$

$\boxed{0 = b}$

① $10 = a - \cancel{b} + c$

$10 = -2 + c$

$+2 \quad +2$

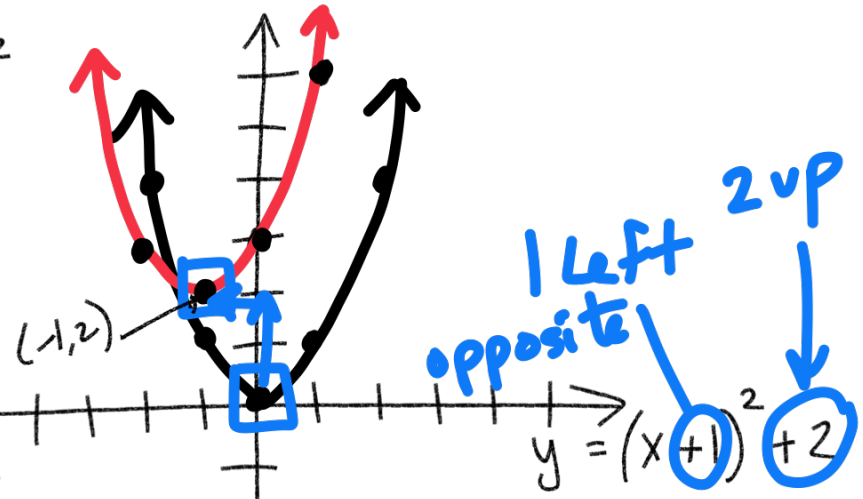
$\boxed{12 = c}$

$y = ax^2 + \cancel{b}^{0}x + c$

$$\boxed{y = -2x^2 + 12}$$

Parent function: $y = x^2$

x	x^2	y	
-2	$(-2)^2$	4	(-2,4)
-1	$(-1)^2$	1	(-1,1)
0	$(0)^2$	0	{(0,0)}
1	$(1)^2$	1	(1,1)
2	$(2)^2$	4	(2,4)



x	$(x+1)^2+2$	y
-2	$(-2+1)^2+2$	3
-1	$(-1+1)^2+2$	2
0	$(0+1)^2+2$	3
1	$(1+1)^2+2$	6
2	$(2+1)^2+2$	11

(-2,3)

(-1,2)

(-1,2) (0,3)

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

opp

vertex (-1, 2) (h,k)

vertex form slope

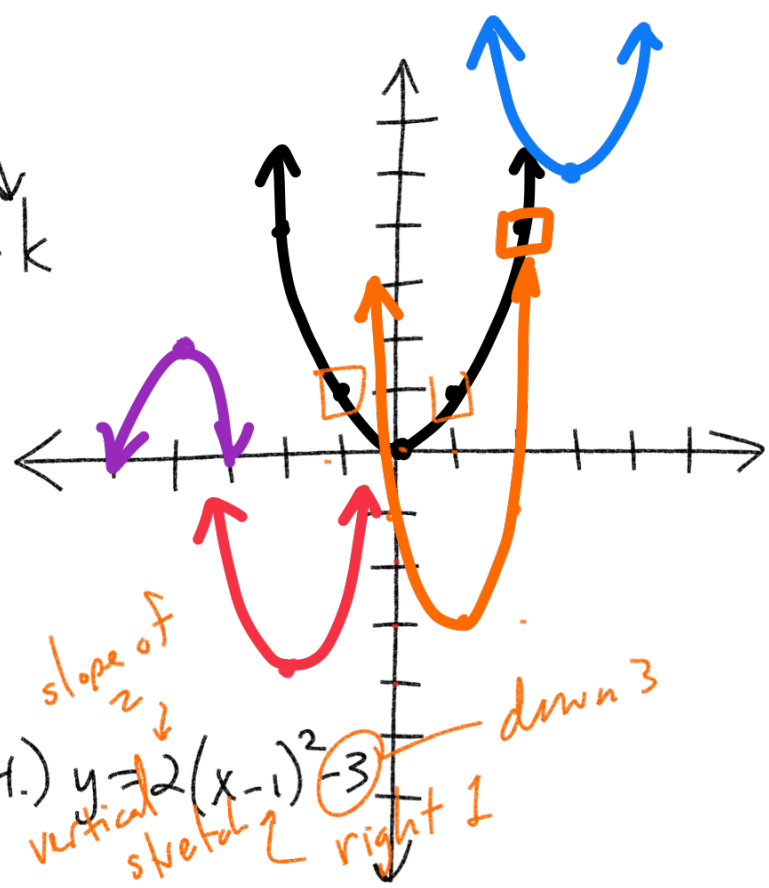
$y = a(x-h)^2 + k$

1.) $y = (x+2)^2 - 4$ — 2 left, 4 down

2.) $y = (x-3)^2 + 5$ — 3 Right, 5 up

3.) $y = -(x+4)^2 + 2$ — left 4, 2 up, flip

4.) $y = 2(x-1)^2 - 3$ — slope of 2, down 3, vertical stretch 2, right 1



$y = x^2$ $\{(0,0)\}$ vertex form

$y = (x-0)^2 + 0$ $y = a(x-h)^2 + k$

x^2 Standard Form vertex??

$y = x^2 + 8x + 11$ vertex form?

$y = x^2 + 8x + 11$ $\left[h = \frac{-b}{2a} \right]$ vertex

$a = 1$ $b = 8$ $c = 11$ $(-4, -5)$

$h = \frac{-b}{2a} = \frac{-(8)}{2(1)} = \frac{-8}{2} = -4$ $y = x^2 + 8x + 11$

Finding k? Plug in h! $y = (-4)^2 + 8(-4) + 11$

$16 - 32 + 11$

$k = -5$ $-16 + 11 = -5$

vertex: (h, k) $(-4, -5)$

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

$y = (x - (-4))^2 - 5$

$y = (x+4)^2 - 5 = x^2 + 8x + 11$