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Rashedul Islam
CRMA 0372
College Readiness Algebra II
Ms. Riley

Unit 2 Assessment so far...

Factoring

Solving Quadratic Equation

1) by Factoring

2) Square Root property $u^2 = K$

3) Quadratic Formula

- Discriminant

4) completing the square

Discriminant

if $b^2 - 4ac > 0$ you have two real solutions

* perfect square - two rational solutions
* not a perfect square - two irrational solutions

if $b^2 - 4ac = 0$ one rational solution.

if $b^2 - 4ac < 0$ two imaginary solution.

one real solution

$6x^2 - 6x - h = 0$

$a = 6 \quad b = -6 \quad c = -h$

$b^2 - 4ac = 0$

$(-6)^2 - 4(6)(-h) = 0$

$36 + 24h = 0$

$-36 \qquad -36$

$\frac{24h}{24} = \frac{-36 \div 12}{24 \div 12}$

$h = -3/2$

Graphing parabolas $f(x) = a(x-h)^2 + k$

1) if $a > 0$, the parabola opens upward 

   if $a < 0$, the parabola opens downward 

2) if $|a| > 1$, the parabola is narrower than the x^2 graph.

   if $0 < |a| < 1$, the parabola is wider than the x^2 graph.

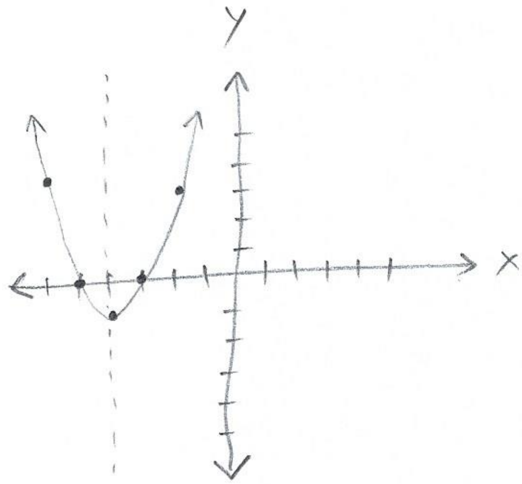
3) the vertex is (h, k).

   axis of symmetry $x = h$ 

4) Domain all real #'s.

Graph

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



1) opens upward
   same shape as x^2.

2) vertex $(-4, -1)$.

x	y
-2	3
-3	0
$\boxed{-4}$	$\boxed{-1}$
-5	0
-6	3

x-intercepts

$0 = (x+4)^2 - \cancel{1}$
$+1 \qquad\qquad +1$

$\sqrt{(x+4)^2} = \sqrt{1}$

$x + 4 = \pm 1$

$x = -4 \pm 1$

$x = -4 + 1 = -3$

or, $x = -4 - 1 = -5$

y-intercepts

let, $x = 0$

$y = (0+4)^2 - 1$
$= 4^2 - 1$
$= 16 - 1$
$= 15$

Graph

$y = \underbrace{2x^2 - 8x}_{} + 6$

factor a out of the x-terms

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

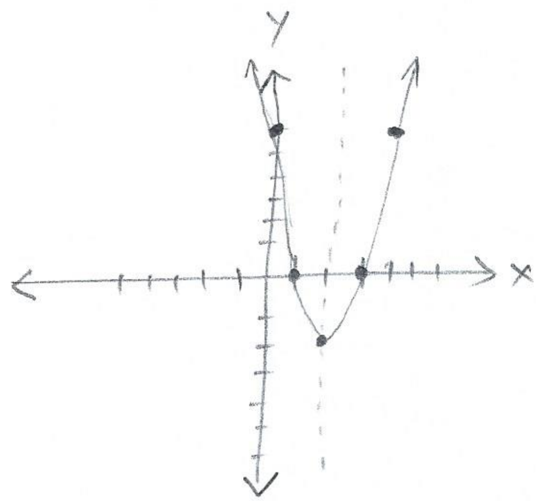
either complete the square first and then do $f(x) = a(x-h)^2 + k$

$y = 2(x^2 - 4x + \square) + 6 - 8$

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

1) opens upward
narrower than x^2

2) Vertex $(2, -2)$



X	Y
0	6
1	0
$\boxed{2}$	$\boxed{-2}$
3	0
4	6

Another way to find vertex

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

vertex $x = \dfrac{-b}{2a}$

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

$x = \dfrac{-(-8)}{2(2)} = \dfrac{8}{4} = 2$

$y = -\frac{3}{2}x^2 - 15x - \frac{75}{2}$

$y = -\frac{3}{2}(x^2 + 10x + 25) - \frac{75}{2} + \frac{75}{2}$

$= -\frac{3}{2}(x+5)^2 + 0$

opens downward

vertex $(-5, 0)$

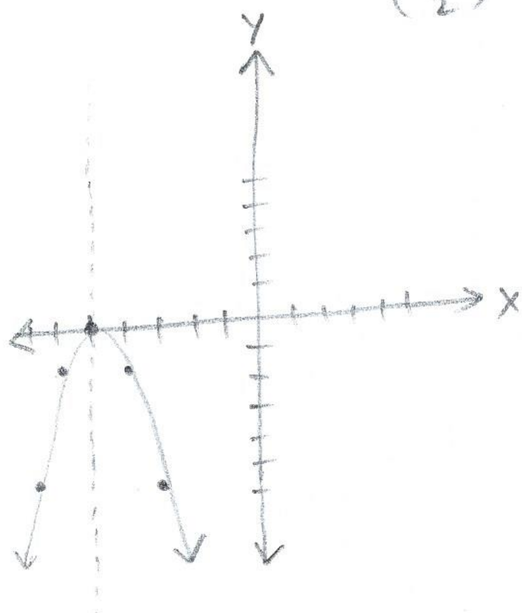
$\frac{-15}{\left(-\frac{3}{2}\right)} = -\overset{5}{\cancel{15}}\left(-\frac{2}{\cancel{3}}\right)$

$= 10$

Magic #

$\left(\frac{10}{2}\right)^2 = (5)^2 = 25$

X	Y
-3	-6
-4	-3/2
$\boxed{-5}$	$\boxed{0}$
-6	-3/2
-7	-6



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

$f(x) = \underbrace{-x^2 - 8x}_{} - 17$

$f(x) = -(x^2 + 8x + 16) - 17 + 16$

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

opens : downward

vertex : $(-4, -1)$

Maximum $y = -1$

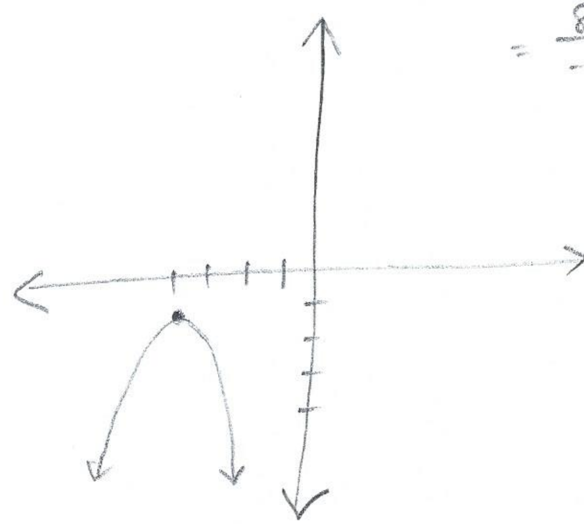
$x = -4$

$a = -1, \ b = -8$

$x = \frac{-b}{2a}$

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

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



Exponent Rules

$$b^m \cdot b^n = b^{m+n}$$

$b^m = \underbrace{b \cdot b \cdot b \ldots b}_{m\text{-times}}$

$2^3 = 2 \cdot 2 \cdot 2$
$= 8$

$w^3 \cdot w^5 = w^8$

$\underbrace{www}\underbrace{wwwww}$

$x^4 \cdot x^4 \cdot x \cdot x^3 = x^{12}$

$-4u^5(-u^5) = 4u^{10}$

$2u \cdot 4u^3 \cdot w^5 \cdot 6w^9 = 48u^4w^{14}$

Quotient Rule

$b \neq 0 \quad \dfrac{b^m}{b^n} = b^{m-n}$

Zero Exponent Rule

$b \neq 0 \quad b^0 = 1$

$1 = \dfrac{2^3}{2^3} = 2^{3-3} = 2^0$

$2000^0 = 1$

$-2000^0 = -1$

$(-2000)^0 = 1$

Negative Exponent Rule.

$$b^{-n} = \frac{1}{b^n} \qquad (2w)^{-5} = \frac{1}{(2w)^5} = \frac{1}{2^5 w^5} = \frac{1}{32w^5}$$

$$w^{-5} = \frac{1}{w^5} \qquad 2 \cdot w^{-5} = \frac{2}{w^5}$$