Review - Part 2

Sept 6/2019

Expanding & Simplifying Quadratic Relations

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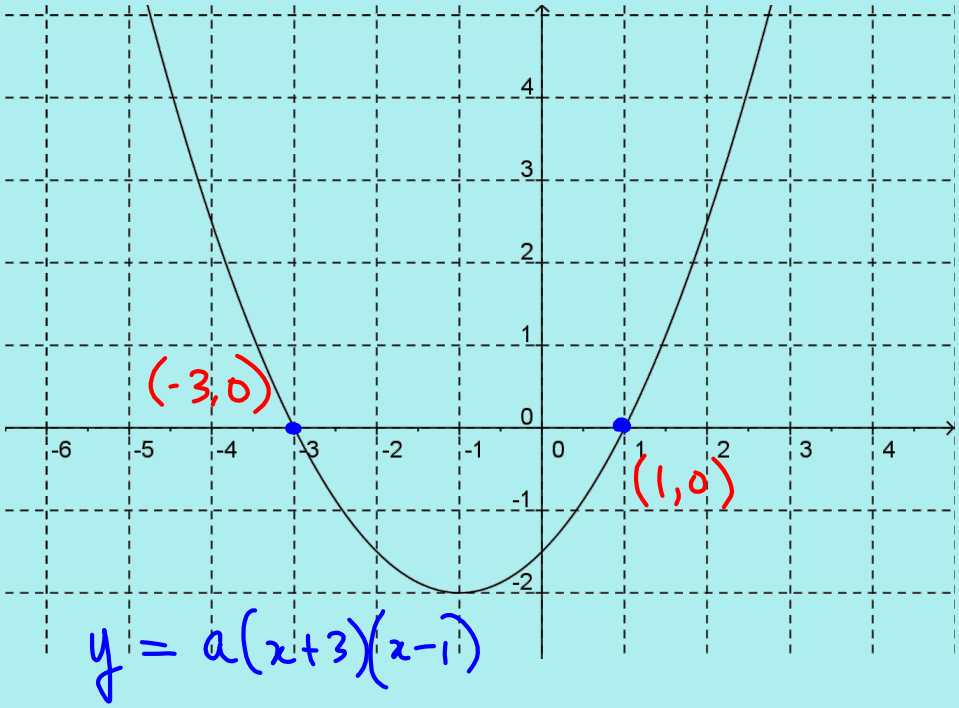
From your worksheet - a Quadratic Relation



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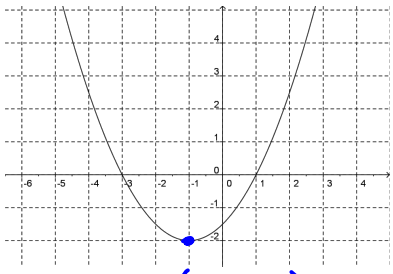
Equation in vertex form:

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



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

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

V(-1,-2)

V(h,k)

to solve for a, sub any point (except vertex)

sub (1,0)

$0 = a(1+1)^2 - 2$

$0 = 4a - 2$

$2 = 4a$

$a = \frac{1}{2}$

$y = \frac{1}{2}(x+1)^2 - 2$

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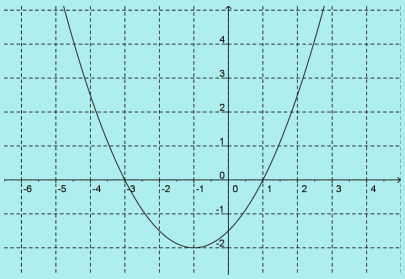
Equation in vertex form:

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



The vertex is (-1, -2)
so h = -1 and k = -2

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

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

To find *a*, substitute any point *except* the vertex

Sub (1, 0): $0 = a(1+1)^2 - 2$

$0 = a(2)^2 - 2$

$2 = 4a$

$a = \frac{1}{2}$

The equation in vertex form is $y = \frac{1}{2}(x+1)^2 - 2$

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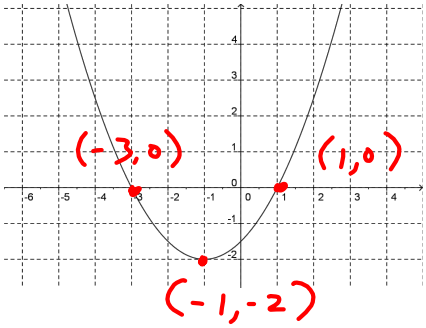
Equation in factored form:

$$y = a(x-s)(x-t)$$



$y = a(x-(-3))(x-(1))$

$y = a(x+3)(x-1)$

sub V(-1,-2)

$-2 = a(-1+3)(-1-1)$

$-2 = a(2)(-2)$

$-2 = a(-4)$

$a = \frac{1}{2}$

$y = \frac{1}{2}(x+3)(x-1)$

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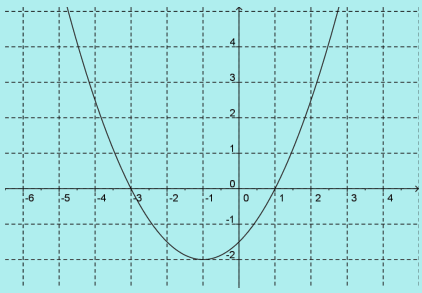
Equation in factored form:

$$y = a(x-s)(x-t)$$

where s and t are the zeroes, or roots, of the parabola

s = -3 and t = 1



$y = a(x-(-3))(x-1)$

$y = a(x+3)(x-1)$

To find *a*, substitute any point *except* one of the zeroes - the vertex is (-1, -2)

$-2 = a(-1+3)(-1-1)$

$-2 = a(2)(-2)$

$-2 = -4a$

$a = \frac{1}{2}$

The equation in factored form is

$$y = \tfrac{1}{2}(x+3)(x-1)$$

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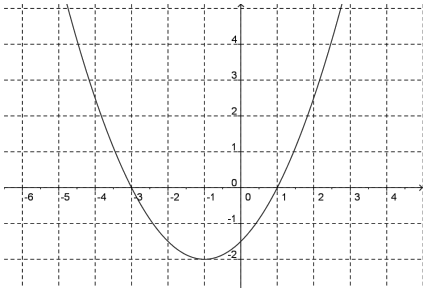
Equation in standard form:

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



$y = \frac{1}{2}(x+1)^2 - 2$

$y = \frac{1}{2}(x+3)(x-1)$

→ expand and simplify to get standard form

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Can also obtain standard form by expanding & simplifying vertex and/or factored form

$y = \frac{1}{2}(x+1)^2 - 2$

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

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

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

$= \frac{1}{2}x^2 + x + \frac{1}{2} - \frac{4}{2}$

$= \frac{1}{2}x^2 + x - \frac{3}{2}$

$y = \frac{1}{2}(x+3)(x-1)$ FOIL

$= \frac{1}{2}(x^2 - x + 3x - 3)$

$= \frac{1}{2}(x^2 + 2x - 3)$

$= \frac{1}{2}x^2 + x - \frac{3}{2}$

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Expanding two binomials

(a) distributive property (FOIL)

$(a+b)(c+d)$

$= ac + ad + bc + bd$

First
Outer
Inner
Last

(b) area model

$(a+b)(c+d)$

$= ac + bc + ad + bd$

	a	+b
c	ac	bc
+d	ad	bd

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Ex.1 Expand each of the following:

(a) $(x+4)(2x-3)$

$= 2x^2 - 3x + 8x - 12$

$= 2x^2 + 5x - 12$

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

$= 4x^2 - 12x + 9$

	2x	−3
2x	$4x^2$	−6x
−3	−6x	+9

(c) $(3x-2y)(x+5y)$

$= 3x^2 + 15xy - 2xy - 10y^2$

$= 3x^2 + 13xy - 10y^2$

(d) $3(2x-5y)(2x+5y)$

$= 3(4x^2 + 10xy - 10xy - 25y^2)$

$= 3(4x^2 - 25y^2)$

$= 12x^2 - 75y^2$

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Assigned Work:

from handout
p.29 # 1acf, 2ace
p.31 # 8ac, 9ace, 10ae
p.33 # 11ace, 12ace, 13ace

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