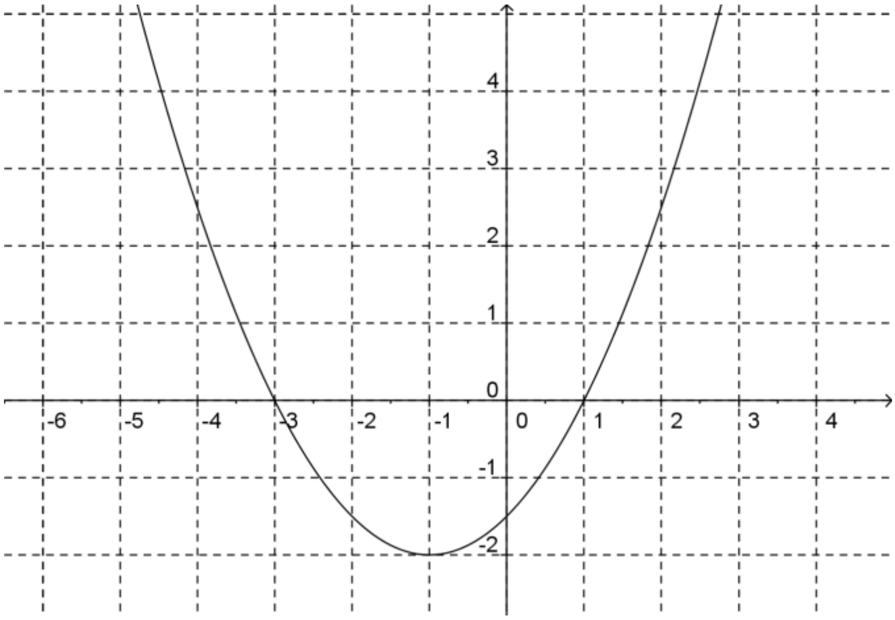
From your worksheet - a Quadratic Relation



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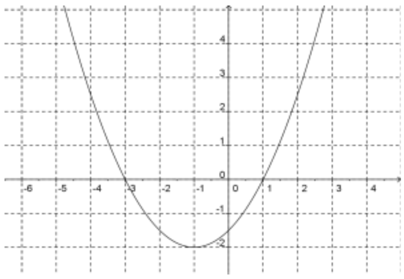
Equation in vertex form:



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

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

$$0 = a(2)^2 - 2$$
$$2 = 4a$$
$$a = \tfrac{1}{2}$$

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

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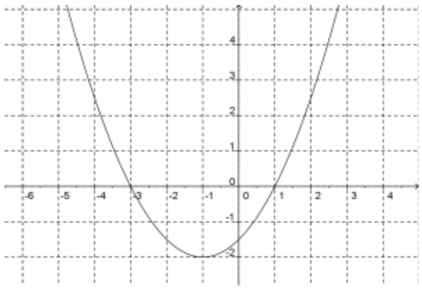
Equation in factored form:

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

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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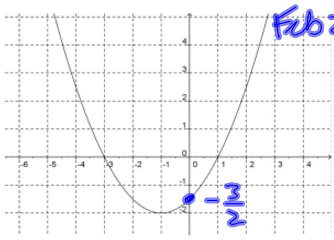
Equation in standard form:

Feb 2/2011

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

y-int



$$y = ax^2 + bx - \frac{3}{2}$$

sub (-3, 0)

$$0 = a(-3)^2 + b(-3) - \frac{3}{2}$$

$$0 = 9a - 3b - \frac{3}{2} \quad [\times 2]$$

$$0 = 18a - 6b - 3 \quad (1)$$

sub (1, 0)

$$0 = a(1)^2 + b(1) - \frac{3}{2}$$

$$0 = a + b - \frac{3}{2} \quad [\times 2]$$

$$0 = 2a + 2b - 3 \quad (2)$$

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① ②

$0 = 18a - 6b - 3$ $\qquad$ $0 = 2a + 2b - 3$

$+\; 0 = 6a + 6b - 9$ $\qquad$ $\times 3$

$0 = 24a \quad - 12$

$12 = 24a$

$a = \frac{1}{2} \longrightarrow$ sub into ②

$0 = 2\left(\frac{1}{2}\right) + 2b - 3$

$0 = 1 + 2b - 3$

$2 = 2b$

$b = 1$

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

Feb 2-9:23 AM

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

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

$y = \frac{1}{2}\underbrace{(x+1)(x+1)}_{\text{expand}} - 2$

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

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

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

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

$y = \frac{1}{2}\underbrace{(x+3)(x-1)}_{\text{expand}}$

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

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

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

Feb 1-7:11 PM

Expanding two binomials

(a) distributive property

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

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

$$= ac + ad + bc + bd$$

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Expanding two binomials

(b) distributive property (using FOIL)

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

$$= ac + ad + bc + bd$$

F - first

O - outer

I - inner

L - last

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Expanding two binomials
(c) area model

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

	a	b
c	ac	bc
d	ad	bd

$ac+bc+ad+bd$

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

	x	2
$2x$	$2x^2$	$4x$
-3	$-3x$	-6

$2x^2+x-6$

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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) $(2x-3)^2$

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

	$2x$	-3
$2x$	$4x^2$	$-6x$
-3	$-6x$	9

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

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

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

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

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

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

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

$3\Big($

	$2x$	$-5y$
$2x$	$4x^2$	$-10xy$
$+5y$	$10xy$	$-25y^2$

$\Big)$

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Homework:

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

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