

Quadratic Functions 1 (KEY)

Precal

Give the quadratic, linear, and constant terms of the following equations.

- 1) $y = 3x^2 + 4x + 5$ 2) $d = -10 + 8c - c^2$ 3) $y = 3x + 7$ 4) $y = 3(4x^2 - 6)$

Quad = $3x^2$	Quad = $-c^2$	Quad = $0x^2$	Quad = $12x^2$
Linear = $4x$	Linear = $8c$	Linear = $3x$	Linear = $0x$
Constant = 5	Constant = -10	Constant = 7	Constant = -18

Give the values of a, b, and c in the following quadratic equations.

- 5) $y = 5x^2 - 12x + 8$ 6) $y = 3x^2 - 10$ 7) $y = -2x^2$ 8) $y = (2x + 5)(x - 3)$

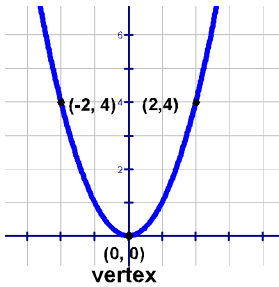
$a = 5, b = -12, c = 8$	$a = 3, b = 0, c = -10$	$a = -2, b = 0, c = 0$	$a = 2, b = -1, c = -15$
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9) What is the graph of an equation? - The set of points whose coordinates satisfy the equation.

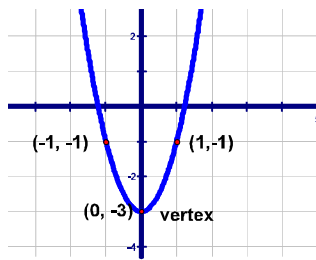
Graph the following quadratic equations by finding the vertex and two other points using a t-table. Check at least one of the points to make sure it satisfies the equation.

- 10) $y = x^2$ $\frac{-b}{2a} = \frac{0}{2(1)} = 0$ 11) $y = 2x^2 - 3$ $\frac{-b}{2a} = \frac{0}{2(2)} = 0$ 12) $y = -x^2 + 2$

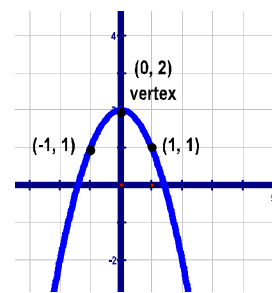
x	0	2	-2
y	0	4	4



x	0	1	-1
y	-3	-1	-1



x	0	1	-1
y	2	1	1



Graph the following quadratic equations by finding the vertex and two other points using function notation. Check at least one of the points to make sure it satisfies the equation.

- 13) $f(x) = 2x^2 - 8x + 12$ 14) $f(x) = -3x^2 - 24x - 39$ 15) $f(x) = x^2 + x - 6$

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

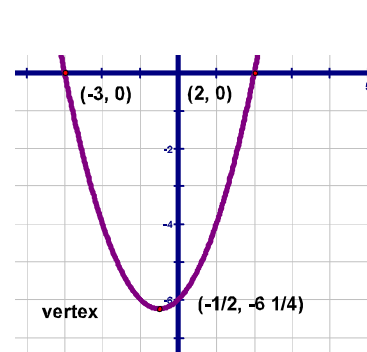
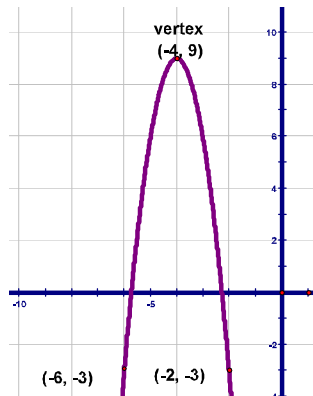
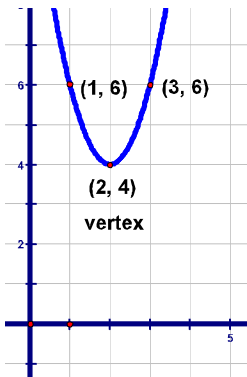
$$\frac{-(-24)}{2(-3)} = \frac{24}{-6} = -4$$

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

vertex $\rightarrow f(2) = 2(2)^2 - 8(2) + 12$
 $= 8 - 16 + 12$
 $= 4$
 (2, 4)

vertex $\rightarrow f(-4) = -3(-4)^2 - 24(-4) - 39$
 $= (-48) + 96 - 39$
 $= 9$
 (-4, 9)

vertex $\rightarrow f(-1/2) = (-1/2)^2 + (-1/2) - 6$
 $= 1/4 - 1/2 - 6$
 $= -6 \frac{1}{4}$
 (-1/2, -6 1/4)



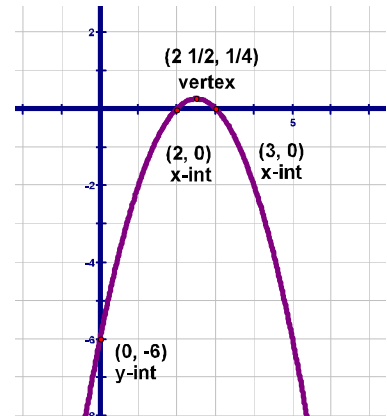
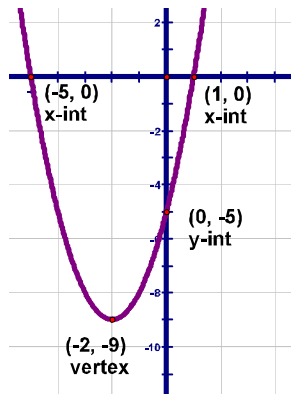
Graph the following equations labeling the vertex, the y-intercept, and the x-intercepts.

16) $y = x^2 + 4x - 5$ $\frac{-b}{2a} = \frac{-4}{2(1)} = \frac{-4}{2} = -2$ 17) $f(x) = -x^2 + 5x - 6$ $\frac{-b}{2a} = \frac{-5}{2(-1)} = \frac{-5}{-2} = \frac{5}{2}$

vertex $\rightarrow y = (-2)^2 + 4(-2) - 5$
 $= 4 - 8 - 5$
 $= -9$

x-int $\rightarrow y = (-5)^2 + 4(-5) - 5$
 $= 25 - 20 - 5$
 $= 0$

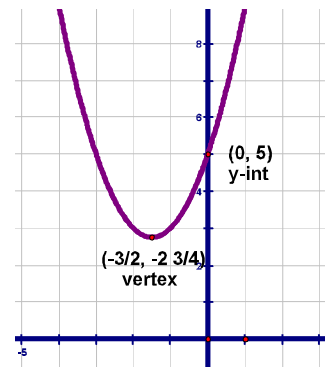
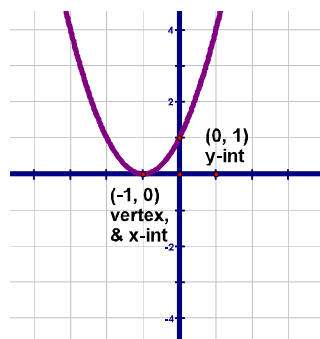
x-int $\rightarrow y = (1)^2 + 4(1) - 5$
 $= 1 + 4 - 5$
 $= 0$
 $(1, 0)$



18) $f(c) = c^2 + 2c + 1$ $\frac{-b}{2a} = \frac{-2}{2(1)} = \frac{-2}{2} = -1$ 19) $y = x^2 + 3x + 5$ $\frac{-3}{2(1)} = \frac{-3}{2}$

vertex $\rightarrow y = (-1)^2 + 2(-1) + 1$
 $= 1 - 2 + 1$
 $= 0$
 $(-1, 0)$

No x-intercept.



Solve the following equations.

20) $0 = x^2 - 4x - 21$
 $0 = (x - 7)(x + 3)$

$x = 7, -3$

22) $0 = 2b^2 + 10b - 12$
 $0 = 2(b^2 + 5b - 6)$
 $0 = 2(b + 6)(b - 1)$

$x = -6, 1$

24) $0 = 3w^2 - 48$
 $0 = 3(w^2 - 16)$
 $0 = 3(w - 4)(w + 4)$

$x = 4, -4$

21) $0 = x^2 + x - 12$
 $0 = (x + 4)(x - 3)$

$x = -4, 3$

23) $0 = x^2 - 49$
 $0 = (b - 7)(b + 7)$

$x = 7, -7$

25) $0 = 10w^2 + 11w - 6$
 $0 = (2w + 3)(5w - 2)$

$x = -3/2, 2/5$