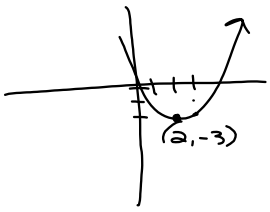
Vertex form

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

(x, y)

vertex



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

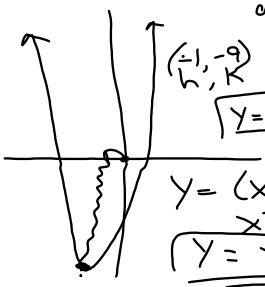
$(x-2)(x-2) - 3$

$x^2 = 2x - 2x + 4 - 3$

$\boxed{x^2 - 4x + 1}$

Apr 4-11:52 AM

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



$(-1, -9)$

h, k

$(x - -1)^2 - 9$

$\boxed{y = (x+1)^2 - 9}$

$y = (x+1)(x+1) - 9$

$x^2 + 2x + 1 - 9$

$\boxed{y = x^2 + 2x - 8}$

$\boxed{(x+4)(x-2)}$

-8

$4 \quad -2$

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$(2, -3)$

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

$(x-4)^2 + 10$

$(4, 10)$

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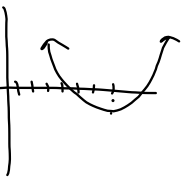
$(7, -2)$

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

$(x-7)^2 - 2$



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$y = 2x^2 - 4x + 4$

AOS $\frac{-b}{2a}$ $\frac{4}{4} = 1$ $x = 1$

$V = (1, 2)$

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

$2(x-1)^2 + 2$

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$x^2 - 16 = 0$

$(x-4)(x+4)$

$x = 4 \quad x = -4$

$x^2 - 16 = 0$

$+16 \quad +16$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

$x^2 - 100 = 0$

$(x-10)(x+10)$

$x = 10 \quad x = -10$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

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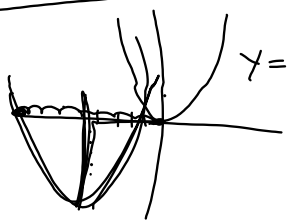
$y = -\frac{1}{2}(x+4)^2 - 8$

$(\underbrace{-4}_{AOS}, -8)$ vertex



$y = x^2$

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$3x^2 - 2x - 8$

-24

$-6 \quad 4$

$-6 \times 4 = -24$

$-6 + 4 = -2$

$\frac{-6}{3x} \quad \frac{4}{3x}$

$\frac{-2}{x} \quad \frac{4}{3x}$

$(x-2)(3x+4) = 0$

$x = \frac{2}{1} \quad \frac{-4}{3}$

$\cancel{3}\left(\frac{-4}{\cancel{3}}\right) + 4$

$3x + 4 = 0$

$-4 \quad -4$

$\frac{3x}{3} = \frac{-4}{3}$

$x = \frac{-4}{3}$

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$2x^2 + 9x + 4$

$(x+4)(2x+1)$

$x = -4 \quad x = -\frac{1}{2}$

8

$\frac{8}{2x} \quad \frac{1}{2x}$

$\frac{4}{x} \quad \frac{1}{2x}$

Quadratic Formula

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$b^2 - 4ac$	Discriminant
> 0	2 Zeros
$= 0$	1 Zero
< 0	No Roots

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$2x^2 + 9x + 4$ Find Roots Using Quad Formula

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Key

$a = 2$

$b = 9$

$c = 4$

$\frac{-9 \pm \sqrt{81 - 4(2)(4)}}{2(2)}$ Do First

81

32

49

$\frac{-9 \pm \sqrt{81 - 32}}{4}$

$\frac{-9 \pm \sqrt{49}}{4} \rightarrow \frac{-9 \pm 7}{4}$

$\frac{-9+7}{4} \quad \frac{-9-7}{4}$

$\frac{-2}{4} \quad \frac{-16}{4}$

$\frac{-1}{2} \quad -4$

Apr 4-12:35 PM

$x^2 - 5x - 36 = 0$

$(x-9)(x+4)$

$x = 9, x = -4$

$a = 1$

$b = -5$

$c = -36$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{5 \pm \sqrt{25 - 4(1)(-36)}}{2(1)}$

$-36 \times 4 = -144$

$\frac{5 \pm \sqrt{25 - -144}}{2}$

$\frac{5 \pm \sqrt{25 + 144}}{2}$

$\frac{5 \pm \sqrt{169}}{2}$

$\frac{5 + 13}{2} \quad \frac{5 - 13}{2}$

$\boxed{9, -4}$

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(3)

$2x^2 + 7x + 3 = 12$

$2x^2 + 7x + 3 - 12 = 0$

$2x^2 + 7x - 9 = 0$

$a = 2$

$b = 7$

$c = -9$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{-7 \pm \sqrt{49 - 4(2)(-9)}}{4}$

$\frac{-7 \pm \sqrt{49 - -72}}{4}$

$\frac{-7 \pm \sqrt{121}}{4}$

$\frac{-7 \pm 11}{4} \rightarrow \frac{-7+11}{4} \quad \frac{-7-11}{4}$

$\boxed{(1, -\frac{9}{2})}$

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$y = x^2 - 4x + 1$ Can't Factor

Use Quad formula

$\boxed{\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}}$

$a = 1$
$b = -4$
$c = 1$

$$\frac{4 \pm \sqrt{16 - 4(1)(1)}}{2(1)}$$

$$\frac{4 \pm \sqrt{16 - 4}}{2}$$

$$\frac{4 \pm \sqrt{12}}{2} = \frac{4 \pm 3.5}{2}$$

$$\frac{4 + 3.5}{2} \qquad \frac{4 - 3.5}{2}$$

$$\frac{7.5}{2}$$

$\boxed{3.75, .25}$

$\boxed{3\frac{3}{4}, \frac{1}{4}}$

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