Cp. 7-0 Quad. Review

Complete the Square- method to solve a Quadratic equation.

① $a=1$ or divide by a $\quad \frac{1}{=}x^2+bx+c=0$

② isolate variables (subtract c) $\quad x^2+bx=-c$

③ find $\left(\frac{b}{2}\right)^2$ & add to both sides $\quad x^2+bx+\left(\frac{b}{2}\right)^2=-c+\left(\frac{b}{2}\right)^2$

④ factor to binomial square $\quad \left(x+\frac{b}{2}\right)^2=-c+\left(\frac{b}{2}\right)^2$

⑤ square root both sides solve for x

EX: $x^2-4x+1=0$ complete the square

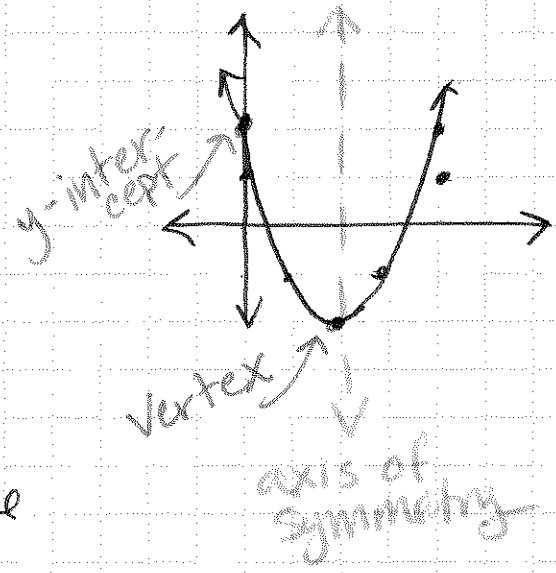
$x^2-4x+4=-1+4$ $\quad b=4$ $\quad \frac{b}{2}=-2$ $\quad \left(\frac{b}{2}\right)^2=4$

$(x-2)^2=3 \rightarrow \sqrt{(x-2)^2}=\pm\sqrt{3}$

$x-2=\pm\sqrt{3}$

$\boxed{x=2\pm\sqrt{3}}$

Parts of a Quadratic function (Review)



axis of symmetry:

divides a parabola into 2 symmetric halves.

Vertex: intersection of AofS and the parabola.

y-intercept → graph crosses the y-axis.

vertex/axis $\left(\frac{-b}{2a}, f(x)\right)$ axis $x = \frac{-b}{2a}$

vertex (x, y)

y-intercept $(0, f(0))$ -or- $(0, c)$

Ex: find A of S, vertex, y-intercept

$f(x) = x^2 + 2x + 3$

axis → $\frac{-b}{2a} = \frac{-2}{2} = -1$ $\boxed{x = -1 \text{ axis}}$

$\boxed{(-1, 2) \text{ vertex}}$

Vertex (y value) $f(-1) = x^2 + 2x + 3$

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

y-intercept $f(0) = x^2 + 2x + 3$

$0^2 + 2(0) + 3 = 3$

$\boxed{\text{y-intercept } (0, 3)}$

Note: discriminant $b^2 - 4ac$

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