Quadratic Equations

$0 = ax^2 + bx + c$

$0 = x^2 + \frac{b}{a}x + \frac{c}{a} = (x-r)(x-s) = x^2 - (r+s)x + rs$

$0 = x^2 - 8x + 15$

$x = 3, 5$

$4 - 8\cdot 3 + 15$ $\qquad$ $25 - 8\cdot 5 + 15$

$0 = (x-3)(x-5)$

$= x^2 - 8x + 15$

$x = 3, 5$

$0 \cdot -2$ $\qquad$ $2 \cdot 0$

$x^2 + 8x + 15 = (x+r)(x+s)$ $\qquad$ Solutions $x = -r, -s$

$x^2 + (r+s)x + rs$

$8 = r + s$

$15 = rs$

$(1x + 3)$

$(1x + 5)$

$15 + 1 \neq 8$

$3 + 5 = 8$

$2x^2 - 3x - 35 = 0$ $\qquad$ $(2x+7)(x-5) = 0$

$(2x + 7)$

$(x - 5)$

$x = -\frac{7}{2}, 5$

$10x - 7x = 3x$

$-10x + 7x = -3x$

$\frac{b}{a} = -r - s$

$ax^2 + bx + c = 0$

$$\boxed{\begin{aligned} -\frac{b}{a} &= r + s \\ \frac{c}{a} &= rs \end{aligned}}$$

Vieta's formulas

Ex: The values $x = -3$ and $x = 7$ are the solutions of $x^2 + Ax + B = 0$. Find $A \cdot B$

$-3 + 7 = -\frac{A}{1}$ $\quad A = -4$

$-3 \cdot 7 = \frac{B}{1}$ $\quad B = -21$

$AB = 84$