

$$y = f(x) = ax^2 + bx + c \quad QF$$

$$\Downarrow$$

$$0 = ax^2 + bx + c$$

$$\text{discriminant} = \boxed{d = b^2 - 4ac}$$

* Key
 $\sqrt{d}$ in
 QUAD
 Form

$d > 0$	2 real solutions
$d > 0$ AND Perf. Sq.	2 real rational solutions
$d = 0$	1 real, rational solution
$d < 0$	2 complex solutions

$$ax^2 + \cancel{bx} + c = 0$$

$b=0$
 Extract
 root

$$\frac{ax^2}{a} = -\frac{c}{a}$$

$$x^2 = \pm \sqrt{-\frac{c}{a}}$$

$$ax^2 + bx + \cancel{c} = 0$$

$$ax^2 + bx = 0$$

$$x(ax + b) = 0$$

$$\textcircled{1} \quad N^2 - 10N = -21$$

$$N^2 - 10N + 21 = 0$$

$$\text{sum} = b = -10$$

$$\text{prod} = ac = 21$$

$$\begin{matrix} 1 \\ -3N - 7N \end{matrix}$$

SHORTCUT
a=1

Long way $\Rightarrow$ NOT NEEDED IN THIS CASE

$$(N^2 - 3N) + (-7N + 21) = 0$$

$$N(\underline{N-3}) + -7(\underline{N-3}) = 0$$

$$(N-3)(N-7) = 0$$

$$N = \{3, 7\}$$

d = ? = positive perf sq.

$$b^2 - 4ac$$

$$a = 1$$

$$(-10)^2 - 4(1)(21)$$

$$b = -10$$

$$100 - 84$$

$$c = 21$$

$$\boxed{16 = d}$$



$$N = \frac{-b \pm \sqrt{d}}{2a}$$

$$= \frac{10 \pm 4}{2}$$

$$= 7, 3 \checkmark$$

$$\textcircled{15} \quad 40 + 43x = -7x^2$$

$$7x^2 + \textcircled{+43x} + 40 = 0$$

$$\text{sum} = 43$$

$$\text{prod} = 280$$

$$\textcircled{35 \quad 8}$$

$$(7x^2 + 35x) + (8x + 40) = 0$$

$$7x(\underline{x+5}) + 8(\underline{x+5}) = 0$$

$$(x+5)(7x+8) = 0$$

$$x = \left\{ -5, -\frac{8}{7} \right\}$$

$$\begin{array}{cc} & 280 \\ & \swarrow \searrow \\ 10 & 28 \\ \swarrow \searrow & \swarrow \searrow \\ \textcircled{2} \textcircled{5} & \textcircled{4} \textcircled{7} \\ & \swarrow \searrow \\ & \textcircled{2} \textcircled{2} \\ & 10, 28 \\ & 20, 14 \\ & \textcircled{35, 8} \end{array}$$

$$\underline{\text{CK}} \quad 40 + 43\left(-\frac{8}{7}\right) \stackrel{?}{=} -7\left(-\frac{8}{7}\right)^2$$

$$\frac{40}{1} - \frac{344}{7} \stackrel{?}{=} -7\left(\frac{64}{49}\right)$$

$$\frac{280}{7} - \frac{344}{7} = -\frac{64}{7} \quad \checkmark$$

GCF

Mth 112 4

$$(19) \quad 20 - 40b = -15b^2$$

$$15b^2 - 40b + 20 = 0$$

$$5(3b^2 - 8b + 4) = 0$$

sum $\Rightarrow -8$

prod = 12

 $-2 \quad -6$

$$(3b^2 - 2b) + (-6b + 4) = 0$$

$$b(\underline{3b - 2}) + -2(\underline{3b - 2}) = 0$$

$$(3b - 2)(b - 2) = 0$$

$$b = \left\{ 2, \frac{2}{3} \right\}$$

Extract Root =

MHh/12⁵

$$(25) \quad 10K^2 - 3 = 517$$

$$10K^2 \text{ (No Linear term)} - 520 = 0$$

$$10K^2 = 520$$

$$K^2 = 52$$

$$K = \pm \sqrt{52}$$

$$= \pm \sqrt{4} \sqrt{13}$$

$$\boxed{K = \pm 2\sqrt{13}}$$

$$10(\sqrt{52})^2 - 3 \stackrel{?}{=} 517$$

$$520 - 3 \stackrel{?}{=} 517 \quad \checkmark$$