

$$(19.) \quad X - 1 - \frac{X^2}{4} = 0$$

$$4X - 4 - X^2 = 0$$

$$X^2 - 4X + 4 = 0$$

$$\text{sum} = -4$$

$$\text{prod} = 4$$

$$\swarrow \searrow$$

$$-2 \quad -2$$

$$(X - 2)^2 = 0$$

$$X = \{2\}$$

CLASS NOTES
MTH112

TUESDAY
8-21-12

Completing the Square

$$\sqrt{X^2 + 6X + 9}$$

$$= (X + 3)$$

$$(X + 3)(X + 3)$$

$$X^2 + 3X + 3X + 9$$

$$X^2 + 6X + 9 \checkmark$$

Force trinomial into

$$\text{PST Form } (a \pm b)^2 = a^2 \pm 2ab + b^2$$

$$(37) \quad 6x^2 - 12x - 51 = -3$$

$$6x^2 - 12x - 48 = 0$$

$$6(x^2 - 2x - 8) = 0$$

CTS

$$\begin{array}{r} 96 \\ -48 \\ \hline 48 \end{array}$$

$$1x^2 - 2x + \{1^2\} = 8 + \{1\}$$

$$\downarrow \quad \downarrow$$

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

$$x-1 = \pm 3$$

$$x = 1 \pm 3 =$$

$$\boxed{\begin{array}{c} \checkmark \quad \checkmark \\ \{4, -2\} \end{array}}$$

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$$5N^2 - 20N + 24 = 9$$

$$5N^2 - 20N + 15 = 0$$

$$5 \underbrace{(N^2 - 4N + 3)}_{\text{CTS}} = 0$$

$$1N^2 - 4N + \{2^2\} = -3 + \{4\}$$
$$\downarrow \quad \quad \quad \downarrow$$
$$(N-2)^2 = 1$$

$$N-2 = \pm 1$$

$$N = 2 \pm 1 = \boxed{\{3, 1\}}$$

$$(17) \quad N^2 + 8N + \{4^2\} = -25 + \{16\}$$

$$\downarrow \quad \downarrow$$

$$(N+4)^2 = -9$$

$$N+4 = \pm 3i$$

$$N = \{-4+3i, -4-3i\}$$

NOTE

$$\sqrt{-9} = \sqrt{-1 \cdot 9}$$

$$= i3$$

$$= 3i$$

$$\stackrel{OK}{=} (-4+3i)^2 + 8(-4+3i) \stackrel{?}{=} -25$$

$$(-4+3i)(-4+3i) - 32 + 24i \stackrel{?}{=} -25$$

$$16 - \cancel{12i} - \cancel{12i} - 9 - 32 + \cancel{24i} \stackrel{?}{=} -25$$

$$-25 = -25 \checkmark$$

$i^1 = i$	1
$i^2 = -1$	2
$i^3 = -i$	3
$i^4 = 1$	0

R

$$(55) \quad -80 + 2N = -N^2$$

$$N^2 + 2N + \{1^2\} = 80 + \{1\}$$

$$\downarrow \qquad \qquad \downarrow$$
$$(N+1)^2 = 81$$

$$N+1 = \pm 9$$

$$N = -1 \pm 9 = \boxed{\{8, -10\}}$$

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

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

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

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

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

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

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

$$\text{CTS } \boxed{x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}}$$

Quao. Form.