10.5 Day 2: Completing the Square when L.C. ≠ 1

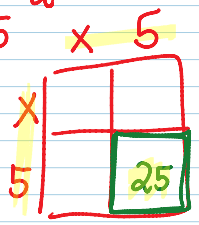
① $2x^2 + 20x = 8$

$\frac{2(x^2+10x)}{2} = \frac{8}{2}$

$x^2 + 10x = 4$

$\frac{10}{2} = 5$

$x^2 + 10x + 25 = 4 + 25$



$\sqrt{(x+5)^2} = \sqrt{29}$

$x + 5 = \pm\sqrt{29}$

$-5 \quad -5$

$x = -5 \pm \sqrt{29}$

② $3x^2 - 24x = -27$

$\frac{3(x^2-8x)}{3} = \frac{-27}{3}$

$x^2 - 8x = -9$

$\frac{-8}{2} = (-4)^2 = 16$

$x^2 - 8x + 16 = -9 + 16$

$\sqrt{(x-4)^2} = \sqrt{7}$

$x - 4 = \pm\sqrt{7}$

$+4 \quad +4$

$x = 4 \pm \sqrt{7}$

③ $2x^2 + 24x + 10 = 0$

$-10 \quad -10$

$2x^2 + 24x = -10$

$\frac{2(x^2+12x)}{2} = \frac{-10}{2}$

$x^2 + 12x = -5$

$\frac{12}{2} = 6^2 = 36$

$x^2 + 12x + 36 = -5 + 36$

$\sqrt{(x+6)^2} = \sqrt{31}$

$x + 6 = \pm\sqrt{31}$

$-6 \quad -6$

$x = -6 \pm \sqrt{31}$

④ $3x^2 - 12x + 3 = -x^2 - 4$

$+x^2 \qquad +x^2$

$4x^2 - 12x + 3 = -4$

$-3 \quad -3$

$4x^2 - 12x = -7$

$\frac{4(x^2-3x)}{4} = \frac{-7}{4}$

$x^2 - 3x = -\frac{7}{4}$

$\left(\frac{-3}{2}\right)^2 = \frac{9}{4}$

$x^2 - 3x + \frac{9}{4} = -\frac{7}{4} + \frac{9}{4}$

$\sqrt{(x-\frac{3}{2})^2} = \sqrt{\frac{1}{2}}$

$x - \frac{3}{2} = \pm\sqrt{\frac{1}{2}}$

$+3$

$$x - \frac{3}{2} = \pm\sqrt{\frac{1}{2}}$$

$$+\frac{3}{2} \quad +\frac{3}{2}$$

$$\boxed{x = \frac{3}{2} \pm \sqrt{\frac{1}{2}}}$$