20-11-2025
Thursday

حل المعادلات التربيعية
بإكمال المربع

① $\frac{2x^2}{2} + \frac{8x}{2} - \frac{24}{2} = 0$

$x^2 + 4x - 12 = 0$

$(x+6)(x-2)$

$x^2 + 4x = 12 \quad (\frac{4}{2})^2 = 4$

$x^2 + 4x + 4 = 16$

$(x+2)(x+2) = 16$

$\sqrt{(x+2)^2} = \pm\sqrt{16}$

$x + 2 = 4$

$-2 \quad -2$

$\boxed{x = 2}$

$x + 2 = -4$

$-2 \quad -2$

$\boxed{x = -6}$

② $\frac{2x^2}{2} + \frac{10x}{2} - \frac{10}{2} = 0$

$x^2 + 10x - 5 = 0$

$x^2 + 10x = 5 \quad (\frac{10}{2})^2 = 25$

$x^2 + 10x + 25 = 5 + 25$

$(x+5)(x+5) = 30$

$\sqrt{(x+5)^2} = \pm\sqrt{30}$

$x + 5 = \sqrt{30} - 5$

-5

$x = \pm\sqrt{30} - 5$

$\boxed{x = +\sqrt{30} - 5}$

$\boxed{x = -\sqrt{30} - 5}$

③ $x^2 - 6x - 11 = 0$

$x^2 - 6x = 11 \quad (\frac{-6}{2})^2 = 9$

$x^2 - 6x + 9 = 20$

$(x-3)(x-3) = 20$

$\sqrt{(x-3)^2} = \pm\sqrt{20}$

$x - 3 = \pm\sqrt{20}$

$+3 \quad +3$

$\boxed{x = \sqrt{20} + 3}$

$\boxed{x = -\sqrt{20} + 3}$

④ $x^2 + 14x - 5 = 0$

$x^2 + 14x = 5 \quad (\frac{14}{2})^2 = 49$

$x^2 + 14x + 49 = 5 + 49$

$(x+7)(x+7) = 54$

$\sqrt{(x+7)^2} = \pm\sqrt{54}$

$x + 7 = \pm\sqrt{54}$

$-7 \quad -7$

$\boxed{x = +\sqrt{54} - 7}$

$\boxed{x = -\sqrt{54} - 7}$

⑤ $x^2 + 2x - 9 = 0$

$x^2 + 2x = 9 \quad (\frac{2}{2})^2 = 1$

$x^2 + 2x + 1 = 10$

$(x+1)(x+1) = 10$

$\sqrt{(x+1)^2} = \pm\sqrt{10}$

$x + 1 = \pm\sqrt{10} - 1$

$-1 \quad -1$

$\boxed{x = +\sqrt{10} - 1}$

$\boxed{x = -\sqrt{10} - 1}$

⑥ $x^2 + 2x - 5 = 0$

$x^2 + 2x = 5 \quad (\frac{2}{2})^2 = 1$

$x^2 + 2x + 1 = 5 + 1$

$(x+1)(x+1) = 6$

$\sqrt{(x+1)^2} = \pm\sqrt{6}$

$x + 1 = \pm\sqrt{6} - 1$

$\boxed{x = +\sqrt{6} - 1}$

$\boxed{x = -\sqrt{6} - 1}$

Five Apple

(ग) $4x^2 - 8x + 1 = 0$

$\frac{4}{4}x^2 - \frac{8}{4}x = -\frac{1}{4}$

$x^2 + 2x + 1 = -\frac{1}{4} + \frac{1}{1} \times 4 = \frac{3}{4}$

$(x+1)(x-1) = \frac{3}{4}$

$\sqrt{(x-1)^2} = \pm\sqrt{\frac{3}{4}}$

$(x-1) = +\frac{\sqrt{3}}{4}$

$(x-1) = -\frac{\sqrt{3}}{4}$