

# ALGEBRA HW (4) SOLUTION

①

Try  $x = 3$

$$6(3)^3 - 29(3)^2 + 36(3) - 9 = 0 \quad \checkmark$$

$$(x-3)(6x^2 + px + 3) = 6x^3 - 29x^2 + 36x - 9$$

$$6x^3 + px^2 + 3x(-18)x^2 - 3px - 9 = 6x^3 - 29x^2 + 36x - 9$$

$x^2$  coeff

$$p - 18 = -29$$

$$p = -11$$

$$\therefore (x-3)(6x^2 - 11x + 3) = 0$$

$$x = 3 \quad \text{or} \quad 6x^2 - 11x + 3 = 0$$

$$(3x-1)(2x-3) = 0$$

$$x = \frac{1}{3} \quad \text{or} \quad x = \frac{3}{2}$$

②

$$x^2 + 10x + 32$$

$$= (x+5)^2 - 25 + 32$$

$$= (x+5)^2 + 7$$

③

$$x + p \text{ factor} \Rightarrow x = -p \text{ root}$$

$$\therefore a(-p)^2 + b = 0$$

$$\Rightarrow ap^2 = -b$$

$$\Rightarrow p^2 = -\frac{b}{a} \quad \text{①}$$

$$a(-p)^2 + b(-p) - ac = 0$$

$$ap^2 - bp - ac = 0 \quad (2)$$

Sub ①

$$a\left(-\frac{b}{a}\right) - bp - ac = 0$$

$$-b - ac = bp$$

$$\boxed{\frac{-b-ac}{b} = p} \quad \checkmark$$

$$(ii) \quad p^2 + p^3 = -\frac{b}{a} + \left(-\frac{b}{a}\right)\left(\frac{-b-ac}{b}\right)$$

$$= -\frac{b}{a} + \frac{b^2 + bac}{a}$$

$$= \cancel{-\frac{b}{a}} + \cancel{\frac{b}{a}} + \frac{ac}{a}$$

$$= \boxed{+c} \quad \checkmark$$