

4.2 - day 2 - Extra Practice

Solve the following Equations:

a) $15x^5(2x - 3)^2 + 45x^3(2x - 3)^3 + 30x^3(2x - 3)^2 = 0$

$$15x^3(2x-3)^2 [x^2 + 3(2x-3) + 2] = 0$$

$$15x^3(2x-3)^2(x^2 + 6x - 7) = 0$$

$$15x^3(2x-3)^2(x+7)(x-1) = 0$$

$\text{sol: } \left\{ -7; 0; 1; \frac{3}{2} \right\}$

b) $(x^2 + 3)^2 - 8(x^2 + 3) + 7 = 0$

Let $t = x^2 + 3$ $t^2 - 8t + 7 = 0$

$$(t-7)(t-1) = 0$$

$$t = 7 \text{ or } t = 1$$

$$x^2 + 3 = 7$$

$$x^2 = 4$$

$x = \pm 2$

$$\text{or } x^2 + 3 = 1$$

$$x^2 = -2$$

no sol.

c) $4(x+2)^2(x-1)^3 - 12(x+2)^3(x-1) + 4(x+2)^2(x-1)(x+9) = 0$

$$4(x+2)^2(x-1) [(x-1)^2 - 3(x+2) + x+9] = 0$$

$$4(x+2)^2(x-1)(x^2 - 2x + 1 - 3x - 6 + x + 9) = 0$$

$$4(x+2)^2(x-1)(x^2 - 4x + 4) = 0$$

$$4(x+2)^2(x-1)(x-2)^2 = 0$$

$\text{sol: } \left\{ -2; 1; 2 \right\}$

d) $(x^2 - 2x)^2 - (2x - 4)^2 = 0$

$$\left((x^2 - 2x) + (2x - 4) \right) \left((x^2 - 2x) - (2x - 4) \right) = 0$$

$$(x^2 - 2x + 2x - 4)(x^2 - 2x - 2x + 4) = 0$$

$$(x^2 - 4)(x^2 - 4x + 4) = 0$$

$$(x+2)(x-2)(x-2)^2 = 0$$

e) $(x+3)^4 - 5(x+3)^2 + 4 = 0$

Let $t = (x+3)^2$

$$t^2 - 5t + 4 = 0$$

$$(t-4)(t-1) = 0$$

$$t = 4 \text{ or } t = 1$$

$$(x+3)^2 = 4$$

$$x+3 = \pm 2$$

$$x = -5 \text{ or } x = -1 \text{ or } x = -4 \text{ or } x = -2$$

$\text{sol: } \left\{ -2; 2 \right\}$

$\text{sol: } \left\{ -5; -4; -2; -1 \right\}$