

Introduction to Maths 1 of 4 and Science

① i) $x^4 \times x^6 \times x$

$$4 + 6 + 1 = 11 \therefore = \boxed{x^{11}}$$

ii) $2x^2 \times 3x^3 \times 2x$

$$2 \times 3 \times 2 = 12 \quad 2 + 3 + 1 = 6$$

$$\Rightarrow \boxed{12x^6}$$

iii) $\frac{x^4 \times x^3 \times x^2}{x^9} \Rightarrow \frac{x^9}{x^9} \Rightarrow \boxed{1}$

iv) $(3x^2)^3 \quad 3^3 = 9$

$$\Rightarrow \cancel{9x^6} \quad \boxed{9x^6}$$

v) $\sqrt{x} \times \sqrt{x}$

$$\Rightarrow x^{\frac{1}{2}} \times x^{\frac{1}{2}} = x^1 \Rightarrow \boxed{x}$$

② i) $15x - 2 = 12x + 9$

$$+2 \Rightarrow 15x = 12x + 9$$

$$-12x \Rightarrow 3x = 9 \therefore \boxed{x = 3}$$

ii) $3(7x - 1) = 6(x + 3)$

$$\Rightarrow 21x - 3 = 6x + 18$$

$$+3 \Rightarrow 21x = 6x + 18$$

$$-6x \Rightarrow 15x = 18 \therefore x = \frac{18}{15} \Rightarrow \boxed{x = \frac{6}{5}}$$

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$$\text{iii)} \frac{5x+3}{4} = \frac{2x-1}{9}$$

$$9(5x+3) = 4(2x-1)$$

$$\Rightarrow 45x + 27 = 8x - 4$$

$$\begin{matrix} -27 \\ -4 \end{matrix} \Rightarrow 45x = 8x - 31$$

$$-8x \Rightarrow 37x = -31$$

$$\div 37 \Rightarrow x = -\frac{31}{37}$$

$$\textcircled{3} \text{ i)} x^2 + 10x + 21 = 0 \quad 7+3=10 \quad 7 \times 3 = 21$$

$$\Rightarrow (x+7)(x+3) \therefore x = -7, x = -3$$

$$\text{ii)} x^2 - 3x + 2 = 0 \quad -2 + -1 = -3 \quad -2 \times -1 = 2$$

$$\Rightarrow (x-2)(x-1) \therefore x = 2, x = 1$$

$$\text{iii)} x^2 + 12x + 20 = 0 \quad 10 + 2 = 12 \quad 10 \times 2 = 20$$

$$\Rightarrow (x+10)(x+2) \therefore x = -10, x = -2$$

$$\text{iv)} x^2 - 64 = 0 \quad 8 + -8 = 0 \quad 8 \times -8 = -64$$

$$\Rightarrow (x-8)(x+8) \therefore x = 8, x = -8$$

$$\text{v)} 2x^2 + 9x + 10 = 0 \quad 5 + 2(2) = 9 \quad 5 \times 2 = 10$$

$$\begin{array}{r|rr} 2x & 5 \\ \hline x & 2x^2 & 5x \\ 2 & 4x & 10 \end{array}$$

$$\Rightarrow (2x+5)(x+2) \therefore x = -\frac{5}{2}, x = -2$$

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$$(4) \quad 14x^2 + 3x - 11 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\Rightarrow 14x^2 + 3x - 11 = 0$$

$$\Rightarrow \frac{-3 \pm \sqrt{-3^2 - (4 \times 14 \times -11)}}{28}$$

$$x = 0.79, x = -1.00$$

$$\Rightarrow \frac{-3 \pm \sqrt{9 - (-616)}}{28}$$

$$\Rightarrow \frac{-3 \pm \sqrt{625}}{28}$$

$$\Rightarrow \cancel{x = 0.79}, \cancel{x = -1.00}$$

$$(5) \quad \begin{aligned} 5x + 3y &= 39 \quad (1) \\ 8x - 2y &= 42 \quad (2) \end{aligned}$$

$$\times 2 \quad 10x + 6y = 78$$

$$\times 3 \quad 24x - 6y = 126$$

$$(1) + (2) = 34x + 0y = 204 \quad \frac{204}{34} = 6$$

$$\therefore x = 6 \quad 10(6) + 6y = 78 \Rightarrow 6y = 18 \therefore y = 3$$

$$(6) \quad 5(2x^2 - y^2) - x^2(x^2 - y) - x^2y - x^4$$

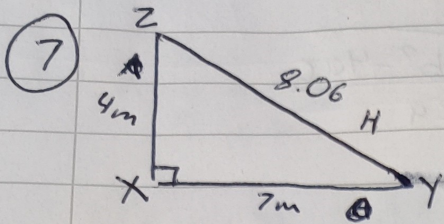
$$\Rightarrow 10x^2 - 5y^2 - x^4 + x^2y - x^2y - x^4$$

$$\Rightarrow 10x^2 - 5y^2 - x^4 - x^4$$

$$\Rightarrow (-2x^4 + 10x^2 - 5y^2)$$

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$$a^2 + b^2 = c^2$$

$$4^2 + 7^2 = 65 \quad \sqrt{65} = 8.06 \text{ m}$$

i) angle Y

$$\Rightarrow \cos(x) = \frac{7}{8.06} \Rightarrow 0.868 \dots$$

$$\Rightarrow x = \cos^{-1}(0.868) = \boxed{29.74^\circ} \quad 2 \text{ DP}$$

ii) Angle Z

$$\Rightarrow \cos(x) = \frac{4}{8.06} \Rightarrow 0.496 \dots$$

$$\Rightarrow x = \cos^{-1}(0.496 \dots) = \boxed{60.25^\circ} \quad 2 \text{ DP}$$

iii) $a^2 + b^2 = c^2$

$$4^2 + 7^2 = 65 \quad \sqrt{65} = \boxed{8.06 \text{ M}} \quad 2 \text{ DP}$$

8 i) $\sqrt[3]{x} \Rightarrow \boxed{x^{\frac{1}{3}}}$

ii) $1 = \boxed{x^0}$