

1)

$$\begin{aligned} \text{i) } x^4 \times x^6 \times x \\ = x^{11} \end{aligned}$$

$$\begin{aligned} \text{ii) } 2x^2 \times 3x^3 \times 2x \\ = 12x^5 \end{aligned}$$

$$\text{iii) } \frac{x^4 \times x^2 \times x^2}{x^9} = \frac{x^9}{x^9}$$

$$= x$$

$$\begin{aligned} \text{iv) } (3x^2)^3 \\ = 3x^2 \times 3x^2 \times 3x^2 \\ = 27x^6 \end{aligned}$$

$$\begin{aligned} \text{v) } \sqrt{x} \times \sqrt{x} \\ = \sqrt{x^2} \\ = x \end{aligned}$$

2)

$$i) 15x - 2 = 12x + 9$$

$$= 15x - 12x = 9 + 2$$

$$3x = 11$$

$$x = \frac{11}{3}$$

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

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

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

$$15x = 21$$

$$x = \frac{21}{15}$$

$$x = \frac{7}{5}$$

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

3)

$$\begin{aligned} \text{i) } x^2 + 10x + 21 &= 0 \\ &= (x+7)(x+3) \\ x &= 7 \quad x = 3 \end{aligned}$$

$$\begin{aligned} \text{ii) } x^2 - 3x + 2 &= 0 \\ &= (x-1)(x-2) \\ x &= 1 \quad x = 2 \end{aligned}$$

$$\begin{aligned} \text{iii) } x^2 + 12x + 20 &= 0 \\ &= (x+4)(x+5) \\ x &= 4 \quad x = 5 \end{aligned}$$

$$\begin{aligned} \text{iv) } x^2 - 64 &= 0 \\ &= x^2 - 0x - 64 \\ &= (x+8)(x-8) \\ x &= 8 \quad x = -8 \end{aligned}$$

$$\begin{aligned} \text{v) } 2x^2 + 9x + 10 &= 0 \\ &= (2x+5)(x+2) \\ x &= -\frac{5}{2} \quad x = -2 \end{aligned}$$

$$4) 14x^2 + 3x = 11$$

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

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

$$x = \frac{-3 \pm \sqrt{625}}{28}$$

$$x = \frac{11}{14} \quad x = -1$$

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

$$\begin{array}{l} 10x + 6y = 78 \\ 24x - 6y = 126 \end{array}$$

$$34x = 204$$

$$x = 6$$

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Using equation 1:

$$5(6) + 3y = 39$$

$$30 + 3y = 39$$

$$3y = 39 - 30$$

$$3y = 9$$

$$y = \frac{9}{3}$$

$$y = 9$$

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

$$10x^2 - 5y^2 - x^4 - xy - x^2y - x^4$$

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

7)

$$i) \tan y = \frac{4}{7}$$

$$= 0.5714$$

$$y = \tan^{-1} 0.5714$$

$$y = 29.7^\circ$$

$$\therefore) 90 - 29.7 \\ = 60.3^\circ$$

$$\begin{aligned} \text{iii) } C^2 &= A^2 + B^2 \\ C^2 &= 4^2 + 7^2 \\ C^2 &= 16 + 49 \\ C^2 &= 65 \\ C &= \sqrt{65} \\ C &= 8.06 \text{ m} \end{aligned}$$