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ACHA3000 Introduction to Math

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1.) (i) $x^4 \times x^6 \times x = x^{4+6+1} = x^{11}$

(ii) $2x^2 \times 3x^3 \times 2x = 12x^{2+3+1} = 12x^6$

(iii) $\frac{x^4 \times x^3 \times x^2}{x^9} = \frac{x^{4+3+2}}{x^9} = \frac{x^9}{x^9} = 1$

(iv) $(3x^2)^3 = (3^3)(x^{2 \times 3}) = 27x^6$

(v) $\sqrt{x} \times \sqrt{x} = x^{1/2} \times x^{1/2} = x^{1/2+1/2} = x^1 = x$

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

$15x - 12x = 9 + 2 \Rightarrow 3x = 11 \Rightarrow x = \frac{11}{3}$

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

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

$\Rightarrow 15x = 21$

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

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

$45x + 27 = 8x - 4 \Rightarrow 45x - 8x = -4 - 27 \Rightarrow 37x = -31$

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

3. (i) $x^2 + 10x + 21 = 0 \Rightarrow (x+7)(x+3) = 0$

$\begin{array}{cc} x & 7 \\ x & 3 \end{array}$

$x+7=0 \quad x+3=0$

$x=-7 \quad x=-3$

(ii) $x^2 - 3x + 2 = 0$

$\begin{array}{cc} x & -2 \\ x & -1 \end{array}$

$(x-2)(x-1)=0 \Rightarrow (x-2)=0 \Rightarrow x=2$

$(x-1)=0 \Rightarrow x=1$

(iii) $x^2 + 12x + 20 = 0 \Rightarrow (x+10)(x+2) = 0$

$\begin{array}{cc} x & 10 \\ x & 2 \end{array}$

$(x+10)=0 \quad x=-10$

$(x+2)=0 \quad x=-2$