

Ex 7D

$$(i) \quad \frac{5}{(x-2)(x+3)} \equiv \frac{A}{x-2} + \frac{B}{x+3}$$

$$5 \equiv A(x+3) + B(x-2)$$

$$x = -3 \quad 5 = -5B \\ B = -1$$

$$x = 2 \quad 5 = 5A \\ A = 1$$

$$\therefore \frac{5}{(x-2)(x+3)} \equiv \frac{1}{x-2} - \frac{1}{x+3}$$

$$(ii) \quad \frac{1}{x(x+1)} \equiv \frac{A}{x} + \frac{B}{x+1}$$

$$1 \equiv A(x+1) + Bx$$

$$x = 0 \quad A = 1$$

$$x = -1 \quad 1 = -B \\ B = -1$$

$$\therefore \frac{1}{x(x+1)} \equiv \frac{1}{x} - \frac{1}{x+1}$$

$$(iii) \quad \frac{6}{(x-1)(x-4)} \equiv \frac{A}{x-1} + \frac{B}{x-4}$$

$$6 \equiv A(x-4) + B(x-1)$$

$$x = 4 \quad 6 = 3B \\ B = 2$$

$$x = 1 \quad 6 = -3A \\ A = -2$$

$$\therefore \frac{6}{(x-1)(x-4)} \equiv \frac{2}{x-4} - \frac{2}{x-1}$$

$$(IV) \quad \frac{x+5}{(x-1)(x+2)} = \frac{A}{x-1} + \frac{B}{x+2}$$

$$x+5 = A(x+2) + B(x-1)$$

$$x = -2 \quad 3 = -3B \\ B = -1$$

$$x = 1 \quad 6 = 3A \\ A = 2$$

$$\therefore \frac{x+5}{(x-1)(x+2)} = \frac{2}{x-1} - \frac{1}{x+2}$$

$$(V) \quad \frac{3x}{(2x-1)(x+1)} = \frac{A}{2x-1} + \frac{B}{x+1}$$

$$3x = A(x+1) + B(2x-1)$$

$$x = -1 \quad -3 = -3B \\ B = 1.$$

$$x = \frac{1}{2} \quad \frac{3}{2} = \frac{3A}{2} \\ A = 1$$

$$\therefore \frac{3x}{(2x-1)(x+1)} = \frac{1}{2x-1} + \frac{1}{x+1}$$

$$(vi) \quad \frac{4}{x^2-2x} = \frac{4}{x(x-2)} = \frac{A}{x} + \frac{B}{x-2}$$

$$4 \equiv A(x-2) + Bx$$

$$x=0 \quad 4 = -2A \\ A = -2$$

$$x=2 \quad 4 = 2B \\ B = 2$$

$$\therefore \frac{4}{x^2-2x} \equiv \frac{2}{x-2} - \frac{2}{x}$$

$$(vii) \quad \frac{2}{(x-1)(3x-1)} \equiv \frac{A}{x-1} + \frac{B}{3x-1}$$

$$2 \equiv A(3x-1) + B(x-1)$$

$$x=1 \quad 2 = 2A \\ A = 1$$

$$x = \frac{1}{3} \quad 2 = -\frac{2}{3}B$$

$$B = 2 \times -\frac{3}{2} = -3$$

$$\therefore \frac{2}{(x-1)(3x-1)} \equiv \frac{1}{x-1} - \frac{3}{3x-1}$$

$$(vii) \quad \frac{x-1}{x^2-3x-4} = \frac{x-1}{(x-4)(x+1)} = \frac{A}{x-4} + \frac{B}{x+1}$$

$$x-1 \equiv A(x+1) + B(x-4)$$

$$x = -1$$

$$-2 = -5B$$

$$B = \frac{2}{5}$$

$$x = 4 \quad 3 = 5A$$

$$A = \frac{3}{5}$$

$$\therefore \frac{x-1}{x^2-3x-4} = \frac{3}{5(x-4)} + \frac{2}{5(x+1)}$$

~~Viii~~

$$(ix) \quad \frac{x+2}{2x^2-x} = \frac{x+2}{x(2x-1)} = \frac{A}{x} + \frac{B}{2x-1}$$

$$x+2 \equiv A(2x-1) + Bx$$

$$x \neq 0 \quad 2 = -A$$

$$A = -2$$

$$x = \frac{1}{2} \quad \frac{5}{2} = \frac{1}{2}B$$

$$B = 5$$

$$\therefore \frac{x+2}{2x^2-x} = \frac{5}{2x-1} - \frac{2}{x}$$

$$(x) \quad \frac{7}{2x^2+x-6} \equiv \frac{7}{(2x-3)(x+2)} \equiv \frac{A}{2x-3} + \frac{B}{x+2}$$

$$\begin{array}{l} 2x^2 + 4x - 3x - 6 \\ 2x(x+2) - 3(x+2) \\ (2x-3)(x+2) \end{array}$$

$$7 = A(x+2) + B(2x-3)$$

$$x = -2$$

$$7 = -7B$$

$$B = -1$$

$$x = \frac{3}{2}$$

$$7 = \frac{7A}{2}$$

$$A = 2$$

$$\frac{7}{2x^2+x-6} = \frac{2}{2x-3} - \frac{1}{x+2}$$

$$(xi) \quad \frac{2x-1}{2x^2+3x-20} \equiv \frac{2x-1}{(x+4)(2x-5)} \equiv \frac{A}{x+4} + \frac{B}{2x-5}$$

$$\begin{aligned} & \text{---} +8, -5 \\ & \text{---} \\ & 2x^2 + 8x - 5x - 20 \\ & 2x(x+4) - 5(x+4) \\ & (x+4)(2x-5) \end{aligned}$$

$$2x-1 \equiv A(2x-5) + B(x+4)$$

$$x = -4 \quad -9 = -13A$$

$$A = \frac{9}{13}$$

$$x = \frac{5}{2} \quad 4 = B\left(\frac{5}{2} + 4\right)$$

$$B = \frac{8}{13}$$

$$\therefore \frac{2x-1}{(x+4)(2x-5)} \equiv \frac{9}{13(x+4)} + \frac{8}{13(2x-5)}$$

$$(xii) \quad \frac{2x+5}{18x^2-8} = \frac{2x+5}{2(9x^2-4)} = \frac{2x+5}{2(3x+2)(3x-2)}$$

$$= \frac{A}{2(3x+2)} + \frac{B}{(3x-2)}$$

$$2x+5 = A(3x-2) + B2(3x+2)$$

$$2x+5 = 3Ax - 2A + 6Bx + 4B$$

$$\equiv x(3A+6B) + 4B-2A$$

Compare Coefficient x : $3A+6B=2$ ~~1~~ (1) †

$$4B-2A=5 \quad \text{(2)}$$

$$-2A+4B=5 \quad \text{(2)}$$

$$\begin{aligned} \text{(xii)} \quad 3A + 6B &= 2 & \text{---(1)} \\ -2A + 4B &= 5 & \text{---(2)} \end{aligned}$$

$$\begin{aligned} \text{(1)} \times 2 & \quad 6A + 12B = 4 \\ \text{(2)} \times 3 & \quad -6A + 12B = 15 \end{aligned}$$

$$\begin{aligned} 24B &= 19 \\ B &= \frac{19}{24} \end{aligned}$$

$$\text{in (1)} \quad 3A + 6\left(\frac{19}{24}\right) = 2$$

$$3A = 2 - \frac{19}{4}$$

$$3A = \frac{-11}{4}$$

$$A = \frac{-11}{12}$$

$$\therefore \frac{2x+5}{18x^2-8} = \frac{19}{24(3x-2)} - \frac{11}{24(3x+2)}$$