

Worksheet # 9, 10, 13, 14, 27, 28, 29, 33, 39, 40

$$\textcircled{9} \frac{4}{x(x-1)} = \frac{A}{x} + \frac{B}{x-1}$$

$$\boxed{\frac{-4}{x} + \frac{4}{x-1}}$$

$$4 = Ax - A + Bx$$

$$0 = A + B \quad A = 4 \quad B = -4$$

$$4 = -A$$

$$\textcircled{10} \frac{3x}{(x+2)(x-1)} = \frac{A}{x+2} + \frac{B}{x-1}$$

$$\boxed{\frac{2}{x+2} + \frac{1}{x-1}}$$

$$3x = Ax - A + Bx + 2B$$

$$3 = A + B \quad B = 1 \quad A = 2$$

$$0 = -A + 2B$$

$$3 = 3B$$

$$\textcircled{13} \frac{x}{(x-1)(x-2)} = \frac{A}{x-1} + \frac{B}{x-2}$$

$$\boxed{\frac{-1}{x-1} + \frac{2}{x-2}}$$

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

$$x = Ax - 2A + Bx - B$$

$$1 = A + B$$

$$0 = -2A - B$$

$$A = -1 \quad B = 2$$

$$1 = -A$$

$$\textcircled{14} \frac{3x}{(x+2)(x-4)} = \frac{A}{x+2} + \frac{B}{x-4}$$

$$\boxed{\frac{1}{x+2} + \frac{2}{x-4}}$$

$$3x = A(x-4) + B(x+2)$$

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

$$3 = A + B$$

$$+12 = -4A + 4B$$

$$\textcircled{-} -4A + 2B$$

$$\textcircled{=} -4A + 2B$$

$$2 = B$$

$$\textcircled{27} \frac{*}{(3x-2)(2x+1)} = \frac{A}{3x-2} + \frac{B}{2x+1}$$

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

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

$$x = 2Ax + A + 3Bx - 2B$$

$$1 = 2A + 3B$$

$$1 = 2A + 3B \quad B = \frac{1}{7}$$

$$0 = A - 2B$$

$$0 = 2A + 4B$$

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

$$1 = 7B$$

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

$$\frac{1/2}{2x+3} + \frac{2/7}{4x-1}$$

$$1 = 4Ax - A + 2Bx + 3B$$

$$0 = 4A + 2B \quad 0 = 4A + 2B$$

$$1 = -A + 3B \quad 1 = 4A + 12B$$

$$0 = -A + 3B \quad | \times 4$$

$$4 = 12B$$

$$2/7 = B$$

29) $\frac{x}{x^2+2x-3} = \frac{A}{x+3} + \frac{B}{x-1}$

$$\frac{3/4}{x+3} + \frac{1/4}{x-1}$$

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

$$x = Ax - A + Bx + 3B$$

$$1 = A + B$$

$$B = 1/4$$

$$0 = -A + 3B$$

$$A = 3/4$$

$$1 = 4B$$

33) $\frac{7x+3}{x^3-2x^2-3x} = \frac{A}{x(x^2-2x-3)} = \frac{A}{x(x-3)(x+1)}$

$$\frac{7x+3}{x(x-3)(x+1)} = \frac{A}{x} + \frac{B}{x-3} + \frac{C}{x+1}$$

$$\frac{-1}{x} + \frac{2}{x-3} + \frac{-1}{x+1}$$

$$7x+3 = \frac{A(x-3)(x+1)}{A(x^2-2x-3)} + \frac{B(x)(x+1)}{B(x^2+x)} + \frac{C(x)(x-3)}{C(x^2-3x)}$$

$$7x+3 = \underline{Ax^2 - 2Ax - 3A} + \underline{Bx^2 + Bx} + \underline{Cx^2 - 3xC}$$

$$0 = A + B + C$$

$$7 = -2A + B - 3C$$

$$3 = -3A$$

matrix Eq:

$$\begin{bmatrix} 1 & 1 & 1 \\ -2 & 1 & -3 \\ 3 & 0 & 0 \end{bmatrix} \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 0 \\ 7 \\ 3 \end{bmatrix}$$

$$X = A^{-1}B$$

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

$$4 = A(x-3) + B(2x+1)$$

$$0 = A + 2B \quad 0 = 3A + 6B$$

$$4 = Ax - 3A + 2xB + B$$

$$4 = -3A + B \quad 4 = -3A + B$$

$$\frac{-8}{7} + \frac{4}{7}$$

$$\frac{-8}{2x+1} + \frac{4}{x-3}$$

$$5A = 7B$$

$$4/7 = B$$

$$\textcircled{40} \quad \frac{4x}{2x^2+3x-2} = \frac{A}{2x-1} + \frac{B}{x+2}$$

$$(2x-1)(x+2) \quad 4x = A(x+2) + B(2x-1)$$

$$4x = Ax + 2A + 2Bx - B$$

$$4 = A + 2B$$

$$4 = A + 2B$$

$$2[0 = 2A - B]$$

$$0 = 4A - 2B$$

$$4 = 5A$$

$$4/5 = A$$

$$4 = 4/5 + 2B$$

$$16/5 = 2B$$

$$8/5 = B$$

$$\frac{\frac{4}{5}}{2x-1} + \frac{\frac{8}{5}}{x+2}$$