

FRACTIONAL EQUATIONS

15. Solve the following equation.

$$\frac{4x-1}{3} - \frac{2x+7}{6} = \frac{5}{2}$$

$\times 3 \times 6 \times 2$

$$\cancel{3} \times 6 \times 2 \times \frac{(4x-1)}{\cancel{3}} - 3 \times \cancel{6} \times 2 \times \frac{(2x+7)}{\cancel{6}} = 3 \times 6 \times \cancel{2} \times \frac{5}{\cancel{2}}$$

$$12(4x-1) - 6(2x+7) = 18 \times 5$$

$$48x - 12 - 12x - 42 = 90$$

$$36x = 90 + 12 + 42$$

$$36x = 154$$

$$x = \frac{154}{36} = \frac{77}{18}$$

[4]

(b) Solve the following equation.

$$\frac{x+3}{6} + \frac{2x-5}{3} = \frac{2}{9}$$

$$\times 6 \times 3 \times 9$$

$$\cancel{6} \times 3 \times 9 \times (\cancel{6} \times \cancel{3} \times \cancel{9} \times \frac{2}{\cancel{9}}) + \cancel{6} \times \cancel{3} \times 9 \times (\cancel{2} \times \cancel{3} \times \cancel{9} \times \frac{2}{\cancel{9}}) = \cancel{6} \times \cancel{3} \times \cancel{9} \times \frac{2}{\cancel{9}}$$

$$27(x+3) + 54(2x-5) = 18 \times 2$$

$$27x + 81 + 108x - 270 = 36$$

$$135x = 36 - 81 + 270$$

$$135x = 225$$

$$x = \frac{225}{135} = \frac{45}{27}$$

[4]

$$\begin{array}{r} 27 \\ \times 3 \\ \hline 81 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 5 \\ \hline 270 \\ \hline \end{array}$$

$$\begin{array}{r} 2706 \\ - 81 \\ \hline 225 \\ \hline \end{array}$$

$$\begin{array}{r} 27 \\ 5 \overline{) 135} \\ \underline{135} \\ 0 \end{array}$$

$$\begin{array}{r} 45 \\ 5 \overline{) 225} \\ \underline{225} \\ 0 \end{array}$$



[4]

7. (a) Solve the following equation.

$$\frac{20+3x}{4} + \frac{5-x}{5} = \frac{13}{4}$$

$\times 4 \times 5$

$$4 \times 5 \times \frac{(20+3x)}{4} + 4 \times 5 \times \frac{(5-x)}{5} = 4 \times 5 \times \frac{13}{4}$$

$$5(20+3x) + 4(5-x) = 5 \times 13$$

$$100 + 15x + 20 - 4x = 65$$

$$11x = 65 - 120$$

$$11x = -55$$

$$x = \frac{-55}{11}$$

$$x = -5$$

(24)

24. Solve the equation $\frac{4x}{3x+2} + \frac{2}{x} = 1$.

$$x(3x+2) \times x$$

$$\cancel{(3x+2)} \times x \times \cancel{(4x)} + \cancel{(3x+2)} \times x \times \cancel{2} = \cancel{(3x+2)} \times x \times 1$$

$$x(4x) + (3x+2) \times 2 = (3x+2) \times x$$

$$x(4x) + 2(3x+2) = x(3x+2)$$

$$4x^2 + 6x + 4 = 3x^2 + 2x$$

$$4x^2 + 6x + 4 - 3x^2 - 2x = 0$$

$$x^2 + 4x + 4 = 0$$

$$(x+2)(x+2) = 0$$

$$\text{either } x+2=0 \quad \text{or } x+2=0$$

$$x=-2$$

$$x=-2$$

[5]

19. Solve $\frac{x+3}{x+1} + \frac{3}{x-3} = 2$.

$x(x+1)(x-3)$

$$\cancel{(x+1)}(x-3) \times \cancel{(x+3)}_{x+1} + (x+1)\cancel{(x-3)}_{x-3} \times 3 = (x+1)(x-3) \times 2$$

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

$$x^2 + 3x - 3x - 9 + 3x + 3 = 2x^2 - 6x + 2x - 6$$

$$x^2 + 3x - 6 = 2x^2 - 4x - 6$$

$$0 = 2x^2 - 4x - 6 - x^2 - 3x + 6$$

$$0 = x^2 - 7x$$

$$x^2 - 7x = 0$$

$$x(x-7) = 0$$

either $x = 0$

or $x - 7 = 0$

$x = 7$

[6]

18. Solve the following equation.

$$\frac{8}{2x-1} + \frac{5x+9}{3x+1} = 4$$

$$x(2x-1)(3x+1)$$

$$\cancel{(2x-1)}(3x+1) \times \frac{8}{\cancel{2x-1}} + \cancel{(2x-1)}(3x+1) \times \frac{(5x+9)}{\cancel{3x+1}} = \cancel{(2x-1)}(3x+1) \times 4$$

$$8(3x+1) + (2x-1)(5x+9) = 4(2x-1)(3x+1)$$

$$24x+8 + 10x^2+18x-5x-9 = 24x^2+8x-12x-4$$

$$10x^2 + 27x - 1 = 24x^2 - 4x - 4$$

$$0 = 24x^2 - 4x - 4 - 10x^2 - 27x + 1$$

$$0 = 14x^2 - 41x - 3$$

$$(14x^2 - 41x - 3) = 0$$

$$(42) \quad -42, +1$$

$$14x^2 - 42x + 1x - 3 = 0$$

$$14x(x-3) + 1(x-3) = 0$$

$$(x-3)(14x+1) = 0$$

either $x-3 = 0$

$$x = 3$$

or $14x+1 = 0$

$$14x = -1$$

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

END OF PAPER