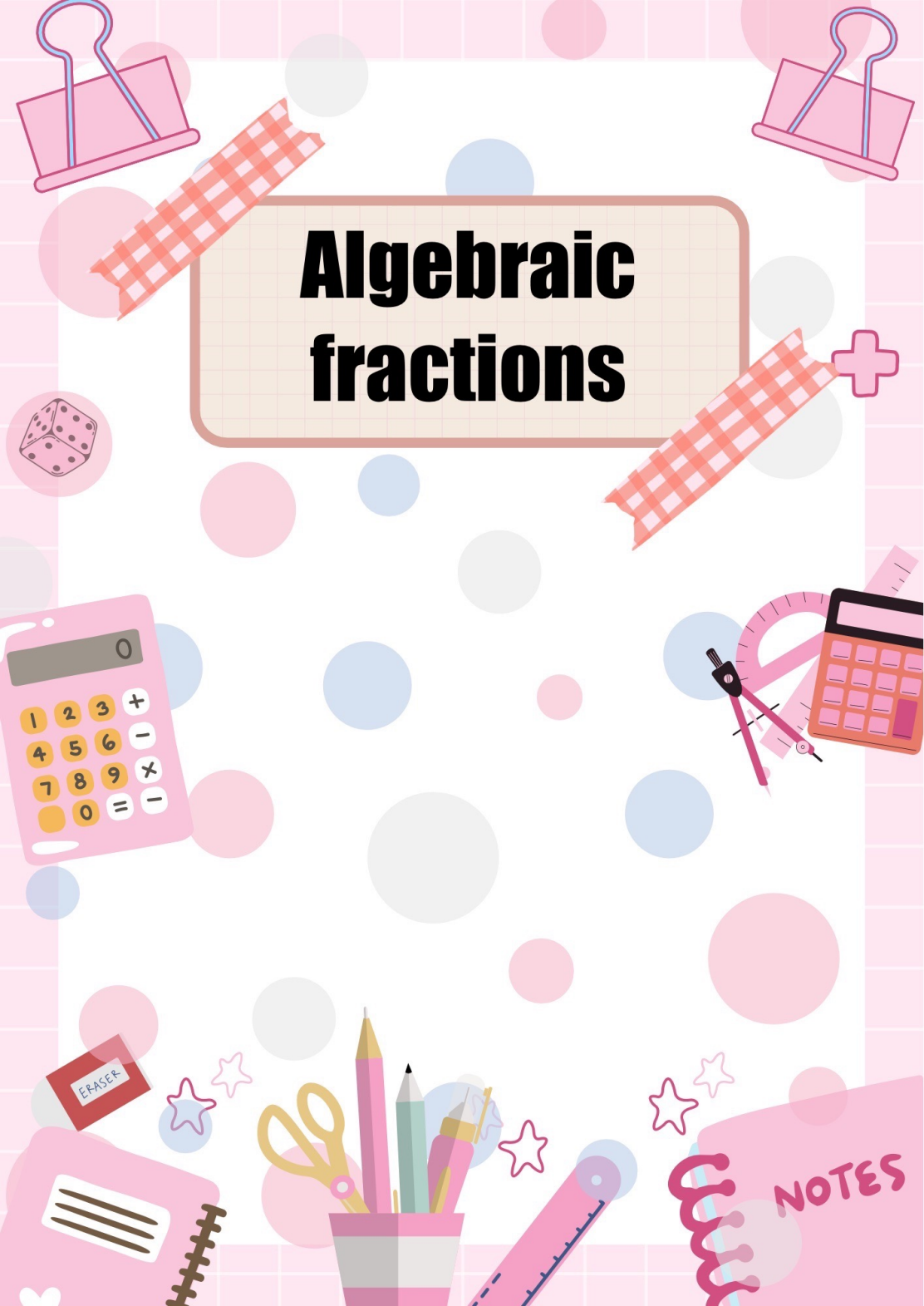


Algebraic fractions



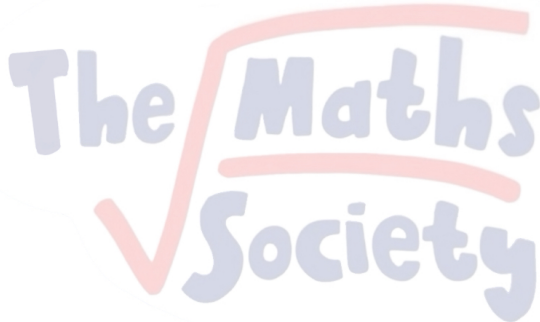
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NOTES

1. Simplify $\frac{7}{4x} + \frac{8}{3x} - \frac{2}{5x}$

Give your answer in its simplest form.

$$\begin{aligned} &= \frac{7(3x)(5x)}{4x(3x)(5x)} + \frac{8(4x)(5x)}{3x(4x)(5x)} - \frac{2(4x)(3x)}{5x(4x)(3x)} \\ &= \frac{105x^2 + 160x^2 - 24x^2}{60x^3} \\ &= \frac{241x^2}{60x^3} = \frac{241}{60x} \end{aligned}$$

The logo for 'The Maths Society' is centered on the page. It features the text 'The Maths Society' in a grey, sans-serif font. A large, stylized red square root symbol is superimposed over the text, with its top bar extending over 'The Maths' and its bottom bar under 'Society'. The entire logo is enclosed within a faint, light blue oval border.

2. Simplify $(x - 3)^2 \div \left[\frac{x^2 - 5x + 6}{2} \right] - \left[\frac{x+2}{x^2 - 4} \right]$

Show your working clearly.

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

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3. Solve $\frac{6x-3}{7} - \frac{2x-3}{5} = \frac{6}{5}$

Show clear algebraic working.

$$\frac{5(6x-3)}{35} - \frac{7(2x-3)}{35} = \frac{6}{5}$$

$$\frac{30x-15}{35} - \frac{14x-21}{35} = \frac{6}{5}$$

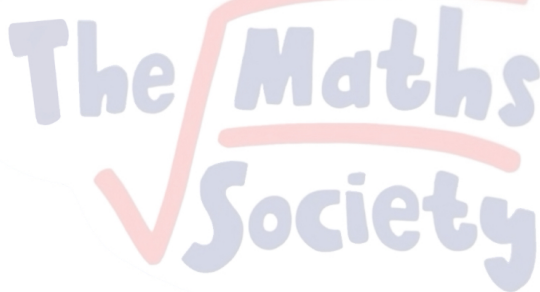
$$\frac{16x+6}{35} = \frac{6}{5}$$

$$16x+6 = 42$$

$$16x = 36$$

$$x = \frac{36}{16} = \frac{9}{4}$$

$$x = \frac{9}{4}$$



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$x = \dots\dots\dots$

4. Express $\frac{8-7x}{6x^2+7x-10} \div \left(\frac{3}{5x-1} - \frac{2}{x+2} \right)$ as a single fraction in its simplest form.

Show clear algebraic working.

$$\begin{aligned}
 &= \frac{8-7x}{6x^2+7x-10} \div \left(\frac{3(x+2) - [2(5x-1)]}{(5x-1)(x+2)} \right) \\
 &= \frac{8-7x}{6x^2+7x-10} \div \frac{3x+6 - 10x+2}{(5x-1)(x+2)} \\
 &= \frac{8-7x}{6x^2+7x-10} \div \frac{-7x+8}{(5x-1)(x+2)} \\
 &= \frac{\cancel{8-7x}}{(6x-5)\cancel{(x+2)}} \times \frac{(5x-1)\cancel{(x+2)}}{-7x+8} \\
 &= \frac{5x-1}{6x-5}
 \end{aligned}$$

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5. Write as a single fraction in its simplest form

$$\frac{x-6}{3} - \frac{8x+2}{4}$$

Show clear algebraic working.

$$\begin{aligned}
 &= \frac{4(x-6) - [3(8x+2)]}{12} \\
 &= \frac{4x - 24 - 24x - 6}{12} \\
 &= \frac{-20x - 30}{12} \\
 &= \frac{\cancel{10}^5 (2x+3)}{\cancel{12}^6} \\
 &= \frac{-5(2x+3)}{6}
 \end{aligned}$$

6. Express $\left(\frac{3}{2x-4} - \frac{4}{x+2}\right) \div \frac{66-15x}{6x^2-4x-16}$ as a single fraction in its simplest form.

Show clear algebraic working.

$$\begin{aligned}
 &= \frac{3(x+2) - [4(2x-4)]}{(2x-4)(x+2)} \div \frac{66-15x}{6x^2-4x-16} \\
 &= \frac{3x+6 - 8x+16}{(2x-4)(x+2)} \div \frac{66-15x}{6x^2-4x-16} \\
 &= \frac{-5x+22}{(2x-4)(x+2)} \times \frac{6x^2-4x-16}{66-15x} \\
 &= \frac{\cancel{22}^{\cancel{11}} \cancel{5x}}{(2x-4)(x+2)} \times \frac{6x^2-4x-16}{3(\cancel{22}^{\cancel{11}} \cancel{5x})} \\
 &= \frac{6x^2-4x-16}{3(2x^2-8)} \\
 &= \frac{\cancel{(x-2)}(3x+4)}{3(\cancel{x-2})(x+2)} \\
 &= \frac{3x+4}{3x+6}
 \end{aligned}$$

7. Show that $\frac{5x-15}{x^2+x-12} \div \frac{x-4}{3x^2-48}$ is equal to an integer.

Show clear algebraic working.

$$= \frac{5x-15}{x^2+x-12} \times \frac{3x^2-48}{x-4}$$

$$= \frac{5(x-3)}{(x-4)(x+3)} \times \frac{3(x^2-16)}{x-4}$$

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

$$= 15$$

