

Algebraic Fractions Mark Scheme

1(a)	$\frac{m}{3} + \frac{m}{4} = \frac{4m}{12} + \frac{3m}{12} = \frac{7m}{12}$	[1]
1(b)	$\frac{x}{16} + \frac{7x}{4} = \frac{x}{16} + \frac{28x}{16} = \frac{29x}{16}$	[1]
1(c)	$\frac{25x}{27} + \frac{2x}{9} = \frac{25x}{27} + \frac{6x}{27} = \frac{31x}{27}$	[1]
2(a)	$\frac{4y}{7} - \frac{6y}{35} = \frac{20y}{35} - \frac{6y}{35} = \frac{14y}{35} = \frac{2y}{5}$	[1]
2(b)	$\frac{10x}{3} - \frac{3}{9} = \frac{10x}{3} - 4a \frac{1}{3} = \frac{10x - 1}{3}$	[1]
2(c)	$\frac{10}{y} - \frac{4}{5} = \frac{50}{5y} - \frac{4y}{5y} = \frac{50 - 4y}{5y}$	[1]
3(a)	$\frac{x - 10}{2} + \frac{3x}{10} = \frac{5(x - 10)}{10} + \frac{3x}{10} = \frac{8x - 50}{10} = \frac{4x - 25}{5}$	[1]
3(b)	$\frac{b - 2}{3} - \frac{b}{2} = \frac{2(b - 2)}{6} - \frac{3b}{6} = \frac{-b - 4}{6}$	[1]
3(c)	$\frac{a + 3}{2} + \frac{2a - 1}{3} = \frac{3a + 9}{6} + \frac{4a - 2}{6} = \frac{7a + 7}{6}$	[1] Forming single algebraic fraction
	$\frac{7(a + 1)}{6}$	[1] Final answer
4(a)	$\frac{3x + 1}{6} + \frac{2x - 2}{4} = \frac{2(3x + 1)}{12} + \frac{3(2x - 2)}{12}$	[1] Forming single algebraic fraction
	$\frac{12x - 4}{12} = \frac{3x - 1}{3}$	[1] Final answer
4(b)	$\frac{4}{2x - 2} + \frac{10}{x - 1} = \frac{4}{2x - 2} + \frac{20}{2(x - 1)}$	[1] Forming single algebraic fraction
	$\frac{24}{2x - 2} = \frac{12}{x - 1}$	[1] Final answer
4(c)	$\frac{3(x + 1)}{5x} + \frac{x}{x + 1} = \frac{3(x + 1)(x + 1)}{5x(x + 1)} + \frac{x(5x)}{5x(x + 1)}$	[1] Simplifying
	$= \frac{3(x^2 + 2x + 1) + 5x^2}{5x^2 + 5x}$	[1] Forming single algebraic fraction
	$\frac{8x^2 + 6x + 3}{5x^2 + 5x}$	[1] Simplifying
5(a)	$\frac{4x(x + 4)}{(x - 4)(x + 4)}$	[1] Factorising
	$\frac{4x}{x - 4}$	[1] Cancelling common term of (x + 4)

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5(b)	$\frac{2(x+2)}{x+1} \div \frac{(x+2)(x-1)}{(2x+3)(x+1)}$	[1] Factorising
	$\frac{2(x+2)}{x+1} \times \frac{(2x+3)(x+1)}{(x+2)(x-1)}$	[1] Reciprocal
	$\frac{2(2x+3)}{x-1} = \frac{4x+6}{x-1}$	[1] Cancelling common terms
6	$\frac{x+2}{x^2+6x+8} = \frac{x+2}{(x+2)(x+4)}$	[1] Factorising bottom left expression
	$\frac{x+2}{x^2+6x+8} \ \& \ \frac{1}{x+4}$	[1] Top left and bottom left are equivalent
7(a)	$\frac{1}{x+5}$	[1] Cancel common factor of $(x-5)$
7(b)	$\frac{(x-2)(x+3)}{(x-4)(x+3)}$	[1] Factorising
	$\frac{x-2}{x-4}$	[1] Cancel common factor of $(x+3)$
8	$\frac{(x+1)}{(2x-3)(x+1)} + \frac{4(2x-3)}{(2x-3)(x+1)} = 1$	[1] Common denominator
	$\frac{x+1+8x-12}{(2x-3)(x+1)} = 1$	[1] Group terms
	$\begin{aligned} 9x-11 &= (2x-3)(x+1) \\ 9x-11 &= 2x^2-x-3 \\ 0 &= 2x^2-10x+8 \end{aligned}$	[1] Rearranging
	$\begin{aligned} x^2-5x+4 &= 0 \\ (x-4)(x-1) &= 0 \\ x &= 1 \text{ or } x = 4 \end{aligned}$	[1] Factorising and solving quadratic
9	$2 \times \frac{5}{x+1} + 2 \times \frac{4}{x+2}$	[1] Correct expression for perimeter
	$\frac{10(x+2)+8(x+1)}{(x+1)(x+2)} = \frac{18x+28}{(x+1)(x+2)}$	[1] Simplifying expression
	$\frac{20}{(x+1)(x+2)}$	[1] Correct expression for area
	$5 \times \frac{20}{(x+1)(x+2)} = \frac{18x+28}{(x+1)(x+2)}$	[1] $5 \times \text{Area} = \text{perimeter}$
	$\begin{aligned} 18x+28 &= 100 \\ \therefore x &= 4 \end{aligned}$	[1] Simplifying

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