FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

A5: Rearranging formulae

Reason about changing the subject of a formula

20 marks · 25 minutes · Non-calculator

1) Ali makes x the subject of $y = 3x + 5$ and writes $x = \frac{y}{3} - 5$. Explain his mistake and give the correct answer.

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[Question 1: 2 marks]

2) Show that making r the subject of $A = \pi r^2$ gives $r = \sqrt{\frac{A}{\pi}}$

[Question 2: 2 marks]

3) Show that $v = u + at$ can be rearranged to $t = \frac{v - u}{a}$

[Question 3: 2 marks]

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4) Explain why making x the subject of $y = x^2$ gives $x = \pm\sqrt{y}$

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[Question 4: 2 marks]

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5) Show that $ax + b = cx + d$ can be rearranged to $x = \frac{d - b}{a - c}$

[Question 5: 3 marks]

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6) Kim rearranges $P = 2(l + w)$ to make w the subject. She writes $w = P - \frac{l}{2}$. Explain her mistake.

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[Question 6: 2 marks]

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7) Show that $y = \frac{x + 1}{x - 2}$ can be rearranged to $x = \frac{2y + 1}{y - 1}$

[Question 7: 3 marks]

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8) Show that $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ can be rearranged to $f = \frac{uv}{u + v}$

[Question 8: 2 marks]

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9) Use $y = 11$ to check that $x = \frac{y-5}{3}$ is a correct rearrangement of $y = 3x + 5$

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[Question 9: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$x = \frac{y-5}{3}$	Divided only y by 3 / wrong order of inverse steps (C1); correct answer (B1).
2	Shown	$r^2 = \frac{A}{\pi}$ (M1); C1.
3	Shown	$v - u = at$ (M1); C1.
4	Explanation	Both $\sqrt{y}$ and $-\sqrt{y}$ square to y (C2).
5	Shown	$ax - cx = d - b$ (M1); $x(a - c)$ (M1); C1.
6	$w = \frac{P}{2} - l$	She should halve P and then subtract l (C1); B1.
7	Shown	$xy - 2y = x + 1$ (M1); $x(y - 1) = 2y + 1$ (M1); C1.
8	Shown	$\frac{1}{f} = \frac{u+v}{uv}$ (M1); reciprocal (C1).
9	Check	$x = 2$ (M1); $3 \times 2 + 5 = 11$ (C1).