FOUNDATION & HIGHER

HIGHER EXTENDS

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

A4: Manipulating expressions

Prove and reason with expanding, factorising and simplifying

20 marks · 25 minutes · Non-calculator

1) Show that $(x + 3)(x - 3) \equiv x^2 - 9$

[Question 1: 2 marks]

2) Ben expands $(x + 4)^2$ and gets $x^2 + 16$. Explain his mistake.

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[Question 2: 2 marks]

3) Show that $(2x + 1)(x + 3) \equiv 2x^2 + 7x + 3$

[Question 3: 2 marks]

4) Ella factorises $6x^2 + 9x$ as $3(2x^2 + 3x)$. Explain why this is not fully factorised and give the full answer.

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[Question 4: 2 marks]

5) Show that $(x + 1)(x + 2)(x + 3) \equiv x^3 + 6x^2 + 11x + 6$

[Question 5: 3 marks]

6) Show that $\frac{x^2 - 4}{x + 2} \equiv x - 2$

[Question 6: 2 marks]

7) Show that $\frac{1}{x} + \frac{1}{x + 1} \equiv \frac{2x + 1}{x(x + 1)}$

[Question 7: 2 marks]

8) Explain why $x^2 + 9$ cannot be factorised as $(x + 3)(x - 3)$.

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[Question 8: 1 marks]

9) Show that $3(x + 2) - 2(x - 1) \equiv x + 8$

[Question 9: 2 marks]

10) Show that $\frac{(2a^3b)^2}{4ab} = a^5b$

[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$x^2 - 3x + 3x - 9$ (M1); C1.
2	$x^2 + 8x + 16$	Missed the middle terms (C1); correct expansion (B1).
3	Shown	$2x^2 + 6x + x + 3$ (M1); C1.
4	$3x(2x + 3)$	x is also a common factor (C1); B1.
5	Shown	$(x^2 + 3x + 2)(x + 3)$ (M1); expansion (M1); C1.
6	Shown	$\frac{(x + 2)(x - 2)}{x + 2}$ (M1); C1.
7	Shown	$\frac{(x + 1) + x}{x(x + 1)}$ (M1); C1.
8	Explanation	$(x + 3)(x - 3) = x^2 - 9$, not +9 (C1).
9	Shown	$3x + 6 - 2x + 2$ (M1); C1.
10	Shown	$\frac{4a^6b^2}{4ab}$ (M1); C1.