FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

A3: Expressions, equations and formulae

Solve problems by writing and using formulae, equations, identities and inequalities

20 marks · 25 minutes · Non-calculator

1) A bike costs £5 to hire plus £3 per hour. Write a formula for the cost C of hiring it for h hours. Jo pays £26. How many hours did she hire it for?

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[Question 1: 3 marks]

2) $3(x + a) + b(x - 1) \equiv 5x + 4$. Find a and b.

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[Question 2: 3 marks]

3) A triangle has sides x, $(x + 3)$ and $(2x - 1)$ cm. Its perimeter is 26 cm. Is it isosceles? Show your working.

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[Question 3: 3 marks]

4) Tickets cost £7 each. Write and solve an inequality to find the greatest number of tickets that can be bought with £50.

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[Question 4: 2 marks]

5) Show that $(n + 1)^2 - n^2 \equiv 2n + 1$. Use this to work out $101^2 - 100^2$ without a calculator.

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[Question 5: 3 marks]

6) Write a formula for the area of a ring between two circles of radius R and r ($R > r$). Find the exact area when $R = 5$ and $r = 3$

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[Question 6: 3 marks]

7) Write an expression for the nth odd number. What is the 50th odd number?

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[Question 7: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	7 hours	$C = 5 + 3h$ (P1); $3h = 21$ (P1); A1.
2	$a = 2, b = 2$	$3 + b = 5$ (P1); $3a - b = 4$ (P1); A1.
3	No	$4x + 2 = 26$ (P1); sides 6, 9, 11 (P1); not isosceles (C1).
4	7	$7n \leqslant 50$ (P1); A1.
5	201	Expansion shown (P1, P1); 201 (A1).
6	16π	$\pi R^2 - \pi r^2$ (P1); $25\pi - 9\pi$ (P1); A1.
7	99	$2n - 1$ (P1, P1); A1.