FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

A2: Substitution

Reason with substitution into expressions and formulae

20 marks · 25 minutes · Non-calculator

1) Show that when $a = 3$ and $b = -2$, $a^2 - 2ab = 21$

[Question 1: 2 marks]

2) Leo says that when $x = -4$, $x^2 = -16$. Explain his mistake.

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[Question 2: 2 marks]

3) $v = u + at$. Show that $v = 20$ when $u = 5$, $a = 3$ and $t = 5$

[Question 3: 2 marks]

4) Show that when $x = -1$, $2x^3 - 3x + 1 = 2$

[Question 4: 2 marks]

5) Is $3x^2 - 12$ negative when $x = 1$? Show your working.

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[Question 5: 2 marks]

6) Ana substitutes $x = 2$ into $3x^2$ and writes $6^2 = 36$. Explain her mistake.

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[Question 6: 2 marks]

7) Which is larger when $n = 0.5$: n^2 or n? Explain.

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[Question 7: 2 marks]

8) $s = \frac{1}{2}(u + v)t$. Show that $s = 60$ when $u = 4$, $v = 8$ and $t = 10$

[Question 8: 2 marks]

9) Use $p = 2$ and $q = -3$ to show that $(p + q)^2$ is not equal to $p^2 + q^2$.

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[Question 9: 2 marks]

10) Explain why the value of $\frac{1}{x}$ cannot be found when $x = 0$.

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[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$9 - 2 \times 3 \times (-2)$ (M1); $9 + 12 = 21$ (C1).
2	16	Negative times negative is positive (C1); 16 (B1).
3	Shown	$5 + 15$ (M1); 20 (C1).
4	Shown	$-2 + 3 + 1$ (M1); 2 (C1).
5	Yes, -9	$3 - 12$ (M1); -9 so negative (C1).
6	12	Squared 3×2 instead of squaring 2 first (C1); $3 \times 4 = 12$ (B1).
7	n	0.25 and 0.5 (M1); squaring a number between 0 and 1 makes it smaller (C1).
8	Shown	$\frac{1}{2} \times 12 \times 10$ (M1); 60 (C1).
9	1 and 13	$(-1)^2 = 1$ and $4 + 9 = 13$ (M1); not equal (C1).
10	Explanation	Division by zero is not defined (C2).