FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

N3: Order of operations

Reason with priority of operations, inverses, powers, roots and reciprocals

20 marks · 25 minutes · Non-calculator

1) Ali works out $6 + 4 \times 2 = 20$. Explain his mistake and give the correct answer.

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[Question 1: 2 marks]

2) Show that $(2 + 3)^2$ is not equal to $2^2 + 3^2$

[Question 2: 2 marks]

3) Insert one pair of brackets to make this true. Show that it works. $24 \div 4 + 2 \times 3 = 12$

[Question 3: 2 marks]

4) Show that $3 \times 2^3 - 4 \div 2 = 22$

[Question 4: 2 marks]

5) A calculator gives $-3^2 = -9$ but $(-3)^2 = 9$. Explain why.

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[Question 5: 2 marks]

6) Use an inverse operation to check that $91.7 \div 7 = 13.1$. Show your check.

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[Question 6: 2 marks]

7) The reciprocal of a positive number is bigger than the number. What can you say about the number? Give an example.

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[Question 7: 2 marks]

8) Use cancelling to show that $\frac{18 \times 25}{9 \times 5} = 10$

[Question 8: 2 marks]

9) Pat says $\sqrt{9+16} = \sqrt{9} + \sqrt{16} = 7$. Explain why Pat is wrong.

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[Question 9: 2 marks]

10) Show that $(5-2)(5+2) = 5^2 - 2^2$

[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	14	Multiplication first (C1); 14 (B1).
2	Shown	25 and 13 (M1); conclusion (C1).
3	$24 \div (4 + 2) \times 3$	Brackets placed (M1); $4 \times 3 = 12$ shown (C1).
4	Shown	$24 - 2$ (M1); 22 (C1).
5	Explanation	Powers come before the negative sign (C1); $(-3)^2 = (-3) \times (-3)$ (C1).
6	Shown	13.1×7 (M1); = 91.7 (C1).
7	Between 0 and 1	Statement (C1); example, e.g. 0.5 has reciprocal 2 (B1).
8	Shown	e.g. $\frac{18}{9} = 2$, $\frac{25}{5} = 5$ (M1); 2×5 (C1).
9	$\sqrt{25} = 5$	Add first (M1); explanation (C1).
10	Shown	$3 \times 7 = 21$ and $25 - 4 = 21$ (M1); conclusion (C1).