FOUNDATION & HIGHER

HIGHER EXTENDS

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

N7: Indices

Reason with integer and fractional indices

20 marks · 25 minutes · Non-calculator

1) Show that $8^{\frac{2}{3}} = 4$

[Question 1: 2 marks]

2) Sami says $2^3 \times 2^4 = 4^7$. Explain his mistake.

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[Question 2: 2 marks]

3) Show that $27^{-\frac{1}{3}} = \frac{1}{3}$

[Question 3: 2 marks]

4) Use $a^3 \div a^3$ to explain why $a^0 = 1$

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[Question 4: 2 marks]

5) Show that $4^{\frac{3}{2}} \times 2^{-1} = 4$

[Question 5: 2 marks]

6) Prove that $9^n = 3^{2n}$ for any value of n.

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[Question 6: 2 marks]

7) Show that $16^{\frac{3}{4}} = 8$

[Question 7: 2 marks]

8) Is 2^{-3} a negative number? Explain.

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[Question 8: 2 marks]

9) Find x when $2^x \times 4 = 32$. Show your reasoning.

[Question 9: 2 marks]

10) Show that $\frac{(x^2)^3}{x^4} = x^2$

[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$(\sqrt[3]{8})^2$ (M1); $2^2 = 4$ (C1).
2	2^7	Bases should stay as 2 (C1); 2^7 (B1).
3	Shown	$\frac{1}{\sqrt[3]{27}}$ (M1); $\frac{1}{3}$ (C1).
4	Explanation	$a^{3-3} = a^0$ (M1); and any number divided by itself is 1 (C1).
5	Shown	$8 \times \frac{1}{2}$ (M1); 4 (C1).
6	Proof	$9 = 3^2$ (M1); $(3^2)^n = 3^{2n}$ (C1).
7	Shown	$(\sqrt[4]{16})^3 = 2^3$ (M1); 8 (C1).
8	No, $\frac{1}{8}$	Negative index means reciprocal (C1); $\frac{1}{8}$ (B1).
9	3	$2^{x+2} = 2^5$ (M1); $x = 3$ (C1).
10	Shown	$\frac{x^6}{x^4}$ (M1); x^2 (C1).