FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

N4: Factors, multiples and primes

Reason with primes, factors, multiples, HCF and LCM

20 marks · 25 minutes · Non-calculator

1) Explain why 51 is not a prime number.

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[Question 1: 1 marks]

2) Jake says the HCF of 12 and 18 is 36. Explain his mistake and find the correct HCF.

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[Question 2: 2 marks]

3) Show that $2 \times 3^2 \times 7 = 126$ and explain why 126 is a multiple of 9

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[Question 3: 2 marks]

4) Prove that the sum of two odd numbers is always even.

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[Question 4: 2 marks]

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5) $180 = 2^2 \times 3^2 \times 5$. Explain why 180 is not a square number.

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[Question 5: 1 marks]

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6) Two lights flash every 8 seconds and every 12 seconds. They flash together now. Show that they next flash together after 24 seconds.

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[Question 6: 2 marks]

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7) Is 1 a prime number? Explain.

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[Question 7: 1 marks]

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8) $A = 2^3 \times 5 \times 7$ and $B = 2 \times 5^2 \times 7$. Show that the HCF of A and B is 70.

[Question 8: 2 marks]

9) Explain why the product of two consecutive integers is always even.

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[Question 9: 2 marks]

10) Show that $2^4 \times 3$ has exactly 10 factors.

[Question 10: 2 marks]

11) Find a number with exactly 3 factors. Explain why your number works.

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[Question 11: 2 marks]

12) Explain why every prime number greater than 2 is odd.

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[Question 12: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$51 = 3 \times 17$	C1.
2	6	HCF cannot be bigger than the numbers; 36 is the LCM (C1); 6 (B1).
3	Shown	$2 \times 9 \times 7 = 126$ (M1); it has 3^2 as a factor (C1).
4	Proof	$(2a + 1) + (2b + 1)$ (M1); $= 2(a + b + 1)$, a multiple of 2 (C1).
5	One factor of 5	Powers of 5 not even (C1).
6	Shown	Multiples of 8 and 12 listed or LCM (M1); 24 is the first common one (C1).
7	No	It has only one factor (C1).
8	Shown	Common primes $2 \times 5 \times 7$ (M1); 70 (C1).
9	Explanation	One of the two must be even (C1); even $\times$ anything is even (C1).
10	Shown	48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 (M1); 10 (C1).
11	e.g. 9	Factors 1, 3, 9 (B1); square of a prime (C1).
12	Explanation	Any even number greater than 2 has 2 as a factor (C1).