1.1 Arithmetic, factors, multiples and primes

Name: _____ Class: _____ Date: _____ **Total: 14 marks**

KEY WORDS prime factorisation • BIDMAS

Objective

Order and calculate with integers, decimals and fractions; use primes, factors, HCF and LCM. Original questions for rules N1–N5.

1 Key knowledge and worked examples

- **Ordering**: negatives < zero < positives; $-3.5 < -3 < -2.9$; on a number line, right is greater.
- **Four operations on fractions**: common denominator to add/subtract; multiply straight across (simplify first); divide by inverting and multiplying. Mixed numbers → improper first.
- **BIDMAS**: Brackets, Indices, Division/Multiplication (left to right), Addition/Subtraction.
- **HCF/LCM from prime decomposition**: $200 = 2^3 \times 5^2$, $60 = 2^2 \times 3 \times 5 \rightarrow$ HCF $= 2^2 \times 5 = 20$; LCM $= 2^3 \times 3 \times 5^2 = 600$.

Worked example (3 marks). Work out 2¾ × 1 and 1/5.

2¾ = 11/4 and 1 and 1/5 = 6/5; 11/4 × 6/5 = 66/20; = 33/10 = 3.3.

2 Practice

2.1 Work out $-8 + 3 \times (-4)$. [2]

2.2 Write 60 as a product of primes. [2]

2.3 Find the HCF of 36 and 48. [2]

3 Exam-style questions

3.1 Work out $3\frac{1}{2} - 1\frac{3}{4}$, giving your answer as a mixed number in its simplest form. [3]

3.2 Two lighthouses flash every 12 s and every 18 s. They flash together at noon. When next do they flash together? [3]

3.3 A temperature is -7 °C. It falls by 9 °C, then rises by 4 °C. Work out the final temperature. [2]

Solutions

2.1 Multiplication first: $3 \times (-4) = -12$; $-8 + (-12) = -20$.

2.2 $60 = 2^2 \times 3 \times 5$.

2.3 $36 = 2^2 \times 3^2$, $48 = 2^4 \times 3 \rightarrow \text{HCF} = 2^2 \times 3 = 12$.

3.1 3½ = 7/2 = 14/4; 1¾ = 7/4; 14/4 − 7/4 = 7/4; = 1¾.

3.2 LCM of 12 and 18: $12 = 2^2 \times 3$, $18 = 2 \times 3^2 \rightarrow \text{LCM} = 2^2 \times 3^2 = 36$; next together 36 s after noon; 12:00:36.

3.3 $-7 - 9 = -16$; $-16 + 4 = -12$ °C.