

Factors Multiples Primes

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Find all factors of 30

Step 1 · Write factor pairs from 1 upwards

$$1 \times 30, 2 \times 15, 3 \times 10, 5 \times 6$$

Step 2 · Check 4: $30 \div 4 = 7.5$ — not exact. Stop after $\sqrt{30} \approx 5.5$

No more pairs to find

Step 3 · List all factors in ascending order

$$1, 2, 3, 5, 6, 10, 15, 30$$

Answer: 1, 2, 3, 5, 6, 10, 15, 30 (8 factors)

Check: $30 \div$ each factor is a whole number ✓

2. Now try one with the steps

Write 36 product of prime factors

Step 1 · Divide by the smallest prime repeatedly: $36 \div 2 = 18$

Step 2 · $18 \div 2 = 9$ (9 is not divisible by 2)

Step 3 · $9 \div 3 = 3$ (3 is prime — stop)

Step 4 · Write using index notation

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. List all the factors of 24. [1]

2. Write the first five multiples of 7. [1]

3. Is 91 prime? Give a reason. [2]

4. Write 60 product of prime factors. [2]

5. Find the HCF of 18 and 24. [2]

6. Find the LCM of 8 and 12. [2]

7. Is 51 prime? Give a reason. [2]

8. List the prime numbers between 30 and 50. [2]

9. Write 84 product of prime factors in index form. [2]

10. Find the HCF of 36 and 60. [2]

11. Find the LCM of 6 and 15. [2]

12. Find the HCF of 48 and 180. [2]

13. One bus leaves every 12 minutes and another every 20 minutes. Both leave the station at 9:00am. At what time do they next leave together? [3]

14. Write 360 product of prime factors in index form. [2]

15. Ella has 42 red counters and 56 blue counters. She puts them all into identical bags, with the same mix in every bag and none left over. What is the greatest number of bags she can fill? [3]

16. $A = 2^3 \times 3 \times 5^2$ and $B = 2 \times 3^2 \times 5$. Find the HCF and the LCM of A and B numbers. [3]

4. Before you hand it in

Listing factors in random order and missing some

Always write factor pairs from 1: $1 \times n$, $2 \times ?$, $3 \times ?$, ... Stop when the two factors in the pair would cross over (past $\sqrt{n}$). Every pair gives two factors.

Saying '1 is prime' or '2 is not prime'

A prime has EXACTLY two factors: 1 and itself. The number 1 has only one factor — not prime. The number 2 has factors 1 and 2 — it IS prime (the only even prime).

Stopping the factor tree before all branches are prime (e.g. writing $2 \times 2 \times 9$)

Keep splitting every branch until every end node is prime. $9 = 3 \times 3$, so the tree must continue: $36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$.

Listing prime factors separately: '2, 2, 3, 3' or writing sum ' $2^2 + 3^2$ '

Prime factorisation must be written PRODUCT: $36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$. The question always says 'product of prime factors'.

Mixing up HCF and LCM

HCF = Highest Common Factor — the biggest number that divides into BOTH (so $HCF \leq$ both numbers). LCM = Lowest Common Multiple — the smallest number that BOTH divide into ($LCM \geq$ both numbers).