Exercise walk-through

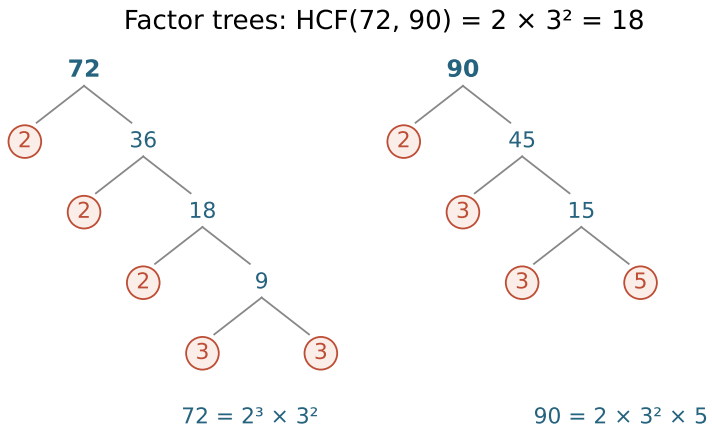
1.3 Percent

Pearson Edexcel · International GCSE · Mathematics A

Integers, four rules and the hierarchy of operations (2)

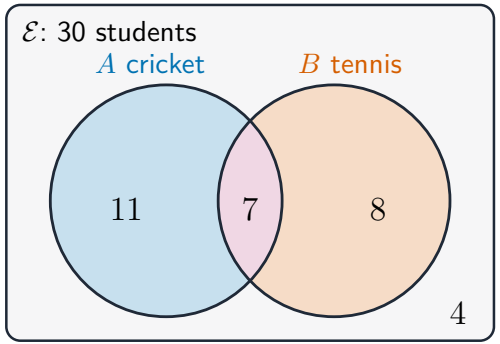
- A **factor** tree gives $72 = 2^3 \times 3^2$ and $90 = 2 \times 3^2 \times 5$.
- The **highest common factor** (HCF) uses each prime in both numbers, with the lower power: $2 \times 3^2 = 18$.
- The **lowest common multiple** (LCM) uses every prime, with the higher power: $2^3 \times 3^2 \times 5 = 360$.

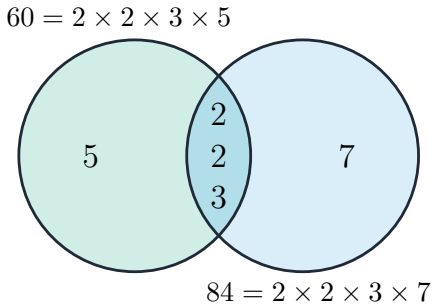
Figure: Integers, four rules and the hierarchy of operations



- **Factor** trees: $72 = 2^3 \times 3^2$ and $90 = 2 \times 3^2 \times 5$, so HCF $= 2 \times 3^2 = 18$
- Match each part of the diagram to the text.

Figure: Sets





$n(A) = 11 + 7 = 18$ $n(A \cup B) = 11 + 7 + 8 = 26$

$n(A \cap B) = 7$ $n(A') = 8 + 4 = 12$

HCF = overlap $= 2 \times 2 \times 3 = 12$

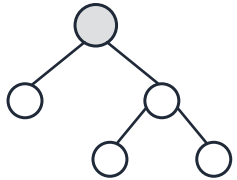
LCM = every region $= 5 \times 2 \times 2 \times 3 \times 7 = 420$

count each region once; HCF multiplies the overlap, LCM multiplies every region

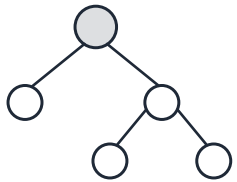
- Left: the class of worked example 5. Right: the prime factors of 60 and 84, with 2, 2, 3 in the overlap, so the HCF is 12 and the LCM is 420.
- Match each part of the diagram to the text.

Exercises 2.1·2.2

2.1 Work out $2^3 \times 2^4$ as a single power, then evaluate [2]

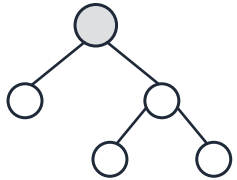


2.2 Write 360 as a product of prime factors [2]



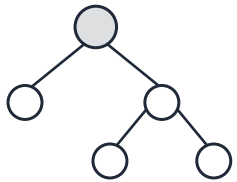
Exercises 2.1·2.2

2.1 Work out $2^3 \times 2^4$ as a single power, then evaluate [2]



2.1 $2^7 = 128$.

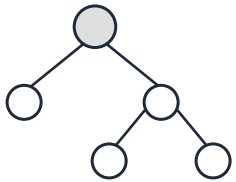
2.2 Write 360 as a product of prime factors [2]



2.2 $360 = 2^3 \times 3^2 \times 5$.

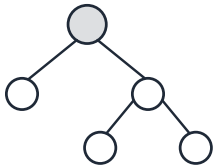
Setup for exercise 2.3

2.3 Find $\sqrt{196}$ [1]

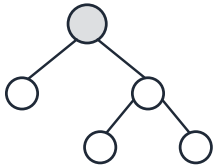


Exercise 2.3

2.4 Work out 5^3 [1]

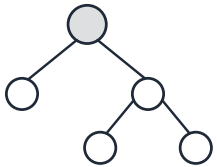


2.5 Find the HCF and LCM of 360 and 84 [4]

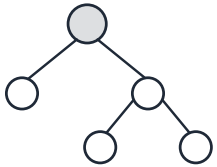


Exercise 2.3

2.4 Work out 5^3 [1]



2.5 Find the HCF and LCM of 360 and 84 [4]



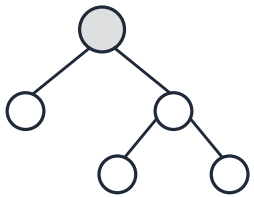
2.3 14.

2.4 125.

2.5 $84 = 2^2 \cdot 3 \cdot 7$; HCF $= 2^2 \cdot 3 = 12$; LCM $= 2^3 \cdot 3^2 \cdot 5 \cdot 7 = 2520$.

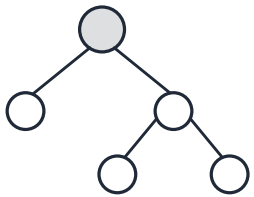
Exercise 3.1

3.1 *(Edexcel 4MA1 1HR June 2024 Q11 family, adapted.)* (a) Write 19600 as a product of powers of prime factors. (b) Given that $A = 2^4 \times 5^2 \times 7^2$ and $B = 2^2 \times 5 \times 7^4$, write $A \times B$ as a product of powers of primes. [4]



Exercise 3.1

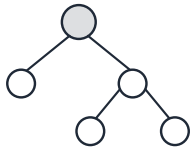
3.1 *(Edexcel 4MA1 1HR June 2024 Q11 family, adapted.)* (a) Write 19600 as a product of powers of prime factors. (b) Given that $A = 2^4 \times 5^2 \times 7^2$ and $B = 2^2 \times 5 \times 7^4$, write $A \times B$ as a product of powers of primes. [4]



3.1 (a) $19600 = 2^4 \times 5^2 \times 7^2$. (b) Add the powers of each prime: $A \times B = 2^6 \times 5^3 \times 7^6$.

Exercise 3.2

3.2 *(Original.)* Two lighthouses flash together every n seconds; one flashes every 18 s, the other every 24 s. Find n. [3]

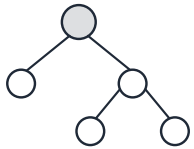


3.3 *(Original.)* A floor is 360 cm by 252 cm. Find the side of the LARGEST square tile that fits exactly. [3]



Exercise 3.2

3.2 *(Original.)* Two lighthouses flash together every n seconds; one flashes every 18 s, the other every 24 s. Find n. [3]



3.3 *(Original.)* A floor is 360 cm by 252 cm. Find the side of the LARGEST square tile that fits exactly. [3]



3.2 n is the LCM of 18 and 24: $18 = 2 \cdot 3^2$, $24 = 2^3 \cdot 3$, so $n = 2^3 \cdot 3^2 = 72$ seconds.

3.3 The tile side is the HCF of 360 and 252: $360 = 2^3 \cdot 3^2 \cdot 5$, $252 = 2^2 \cdot 3^2 \cdot 7$, so HCF $= 2^2 \cdot 3^2 = 36$ cm.

Local review guidance: prime factorisations before any product; power notation exact; context answers name which of HCF/LCM the question needs. This is authored classroom guidance.