

E1.1 Types of number

Name: _____ Class: _____ Date: _____

Total: 12 marks**KEY WORDS** factor 因数 • integer 整数 • hcf 最大公因数 • lcm 最小公倍数 • common multiple 公倍数

Objective

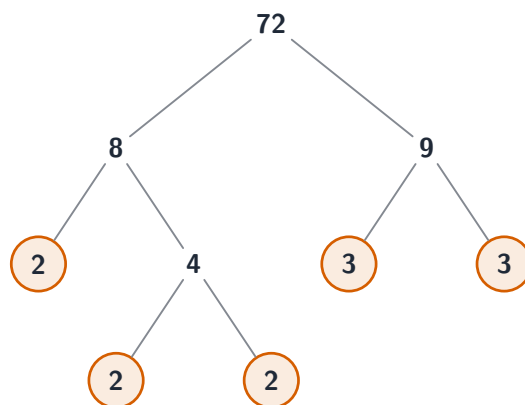
Build the skills to answer Extended exam questions on **types of number** 数的类型 — **prime factors** 质因数, **HCF and LCM** 最大公因数和最小公倍数, and **rational and irrational** 有理数和无理数 numbers.

You must be able to:

- write a number as a product of its prime factors
- find the HCF and LCM using prime factors
- identify rational and irrational numbers

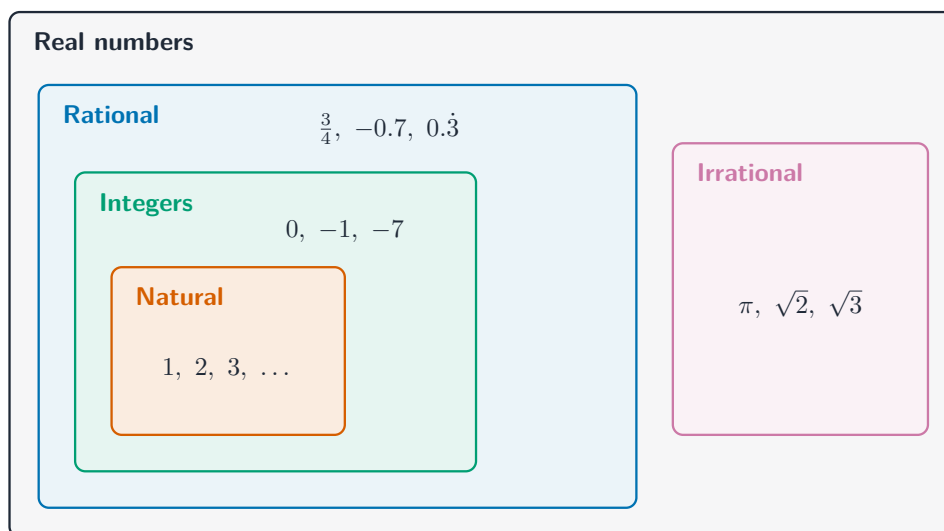
1 Worked examples

■ Prime factors, HCF and LCM



$$72 = 2^3 \times 3^2$$

Keep dividing by the smallest prime that fits



The number sets: natural, integer, rational and real

- **Prime factors:** $72 = 2^3 \times 3^2$ (split until every branch is prime).
- **HCF** 最大公因数: the **lowest** power of each shared prime. **LCM** 最小公倍数: the **highest** power of every prime.
- **Worked (72 and 120):** $72 = 2^3 \times 3^2$, $120 = 2^3 \times 3 \times 5 \rightarrow \text{HCF} = 2^3 \times 3 = 24$, $\text{LCM} = 2^3 \times 3^2 \times 5 = 360$.
- **Irrational** 无理数: cannot be written as a fraction (e.g. $\pi, \sqrt{2}$).

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the correct answer):

2 Practice

2.1 Write 90 as a product of its prime factors. [2]

2.2 From the list $\sqrt{9}, \pi, \frac{2}{3}, \sqrt{5}$, write down the two **irrational** numbers. [2]

2.3 Find the HCF of 24 and 36. [2]

3 Exam-style questions

3.1 $A = 2^2 \times 3 \times 5$ and $B = 2 \times 3^2 \times 5$.

(a) Find the HCF of A and B . [2]

(b) Find the LCM of A and B . [2]

3.2 Find the lowest common multiple (LCM) of 18 and 24. [2]

Solutions

Marking: **M1** a correct method, **A1** the correct answer (allow follow-through where sensible).

2.1 $90 = 2 \times 3^2 \times 5$.

2.2 π and $\sqrt{5}$.

2.3 $24 = 2^3 \times 3$, $36 = 2^2 \times 3^2 \rightarrow \text{HCF} = 2^2 \times 3 = 12$.

3.1 (a) HCF — lowest power of each shared prime: $2^1 \times 3 \times 5 = 30$. (b) LCM — highest power of every prime: $2^2 \times 3^2 \times 5 = 180$.

3.2 $18 = 2 \times 3^2$, $24 = 2^3 \times 3 \rightarrow \text{LCM} = 2^3 \times 3^2 = 72$.