GCD and LCM Example

Find the greatest common divisor and least common multiple of 84 and 30

WORKED EXAMPLE

The greatest common divisor (GCD) is the largest positive integer that divides both inputs. The least common multiple (LCM) is the smallest positive integer that is a multiple of both.

Problem

Find gcd(84, 30) and lcm(84, 30).

KEY FACT	VALUE
84	2^2 x 3 x 7
30	2 x 3 x 5
GCD	6
LCM	420

Step-by-step solution

1. Apply the Euclidean algorithm

Divide and carry each remainder into the next division. Stop when the remainder is zero.

84 = 2 x 30 + 24; 30 = 1 x 24 + 6; 24 = 4 x 6 + 0

2. Read the GCD

The last nonzero remainder is the greatest common divisor.

gcd(84, 30) = 6

3. Compare prime factorizations

For the LCM, select the highest exponent of every prime present in either number.

84 = 2^2 x 3 x 7; 30 = 2 x 3 x 5

4. Multiply the selected prime powers

The product is the smallest positive number divisible by both inputs.

lcm(84, 30) = 2^2 x 3 x 5 x 7 = 420

ANSWER

gcd(84, 30) = 6 and lcm(84, 30) = 420.

Check

6 divides both 84 and 30; 420 is divisible by both. The identity also holds: 6 x 420 = 84 x 30 = 2,520.