PRODUCT OF PRIME FACTORS

- A prime number has only two factors, 1 and itself.

are prime numbers.

- Any positive integer (counting numbers) can be expressed as the product of two or more prime numbers.
- The method is to divide by prime numbers starting with the lowest.
- Prime factors can then be collected and expressed in index form.

Example 1

Express 40 as the product of primes

Solution

2	40
2	20
2	10
5	5
	1

2 will not go into 5, nor will 3, but 5 will.

Keep dividing by prime numbers until you get to 1.

The prime factors of 40 are 2 and 5.

40 as a product of primes $= 2 \times 2 \times 2 \times 5$

In index form: $= 2^3 \times 5$

Example 2

Express 1120 as a product of primes.

Solution

2	1120
2	560
2	280
2	140
2	70
5	35
7	7
	1

1120 as a product of primes = $2^5 \times 5 \times 7$

Examples

$36 = 2^2 \times 3^2$

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

$65 = 5 \times 13$

$42 = 2 \times 3 \times 7$

$64 = 2^6$

$95 = 5 \times 19$

$144 = 2^4 \times 3^2$

$343 = 7^3$

HIGHEST COMMON FACTORS (HCF)

- The HCF of any two numbers is the greatest number that is a factor of both given numbers.

Example 1

Find the HCF of 9 and 12

Solution

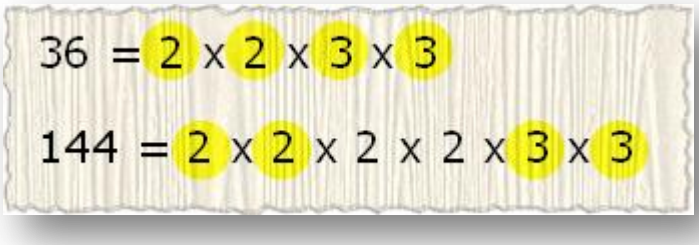
The HCF is 3.

- When the HCF is not obvious, write both numbers as a product of primes and look for common factors.

Example 1

Find the HCF of 36 and 144

Solution



$2 \times 2 \times 3 \times 3$ is common to both numbers

$\therefore 2 \times 2 \times 3 \times 3 = 36$ is the HCF.

LOWEST COMMON MULTIPLE (LCM)

- The LCM of any two numbers is the smallest number that is a multiple of both given numbers.

Example 1

Find the LCM of 3 and 5

Solution

The LCM is 15.

- When the LCM is not obvious, write both numbers as a product of primes and look for common factors.

Example 1

Find the LCM of 12 and 15

Solution