PRIME FACTORIZATION

PRIME FACTORIZATION

Every composite number can be expressed as a product of prime numbers.

This is called the prime factorization of a number.

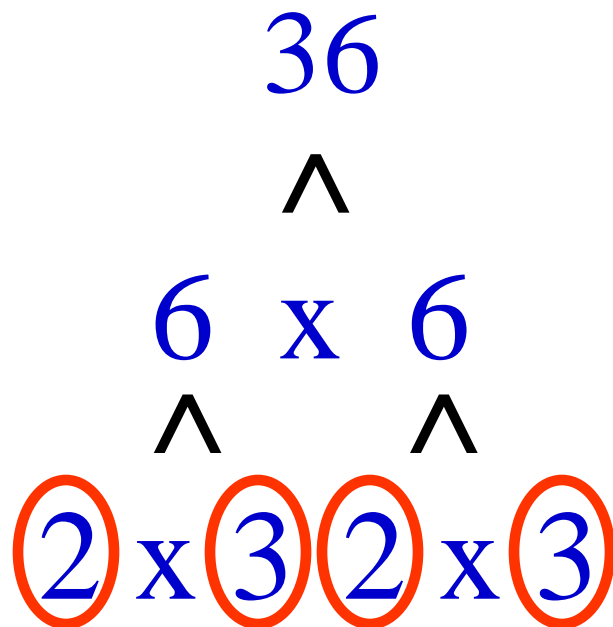# PRIME FACTORIZATION

To find the prime factorization of a number, you can use a factor tree.

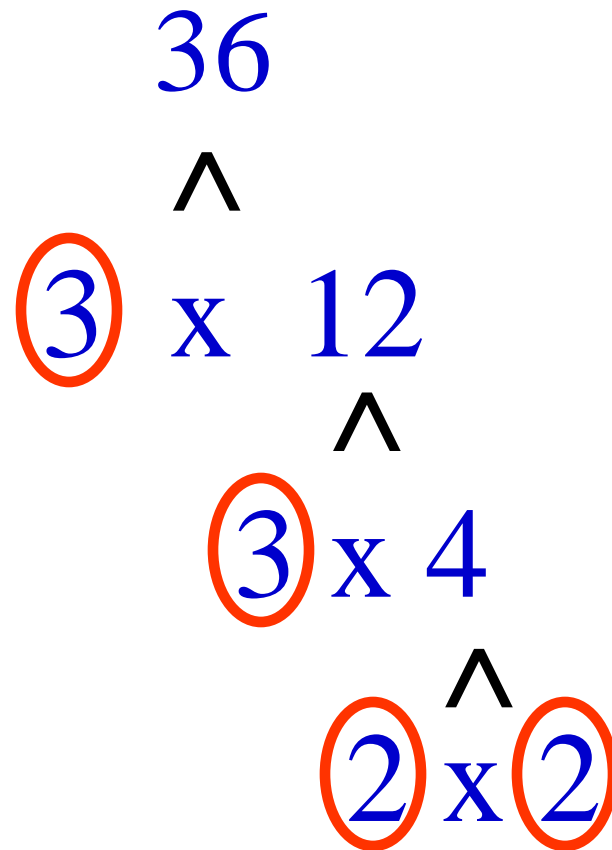# FACTOR TREES

36
∧
6 x 6
∧ ∧
2 x 3 2 x 3

$$36 = 2 \times 2 \times 3 \times 3 \quad \textit{\underline{or}} \quad 2^2 \times 3^2$$

FACTOR TREES

36

^

(3) x 12

^

(3) x 4

^

(2) x (2)

36 = 2 x 2 x 3 x 3 _*or*_ 2^2 x 3^2

FACTOR TREES

$$9$$

$$\wedge$$

$$3 \times 3$$

$$9 = 3 \times 3 \quad \textit{\underline{or}} \quad 3^2$$

FACTOR TREES

$$21$$

$$\wedge$$

$$\textcircled{3} \times \textcircled{7}$$

$$21 = 3 \times 7$$

FACTOR TREES

100

^

10 x 10

^   ^

2 x 5 2 x 5

$100 = 2 \times 2 \times 5 \times 5$ _or_ $2^2 \times 5^2$

PRIME FACTORIZATION

To find the prime factorization of a number, you can use a factor ladder.

FACTOR LADDERS

$2\lfloor 36$

$2\lfloor 18$

$3\lfloor 9$

3

Begin with the least prime number that is a factor.

Repeat until the quotient is prime.

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

FACTOR LADDERS

2 ⌋ 60

2 ⌋ 30

3 ⌋ 15

5

Begin with the least prime number that is a factor.

Repeat until the quotient is prime.

$60 = 2 \text{ x } 2 \text{ x } 3 \text{ x } 5$ **_or_** $2^2 \text{ x } 3 \text{ x } 5$

FACTOR LADDERS

3⌊45

3⌊15

5

Begin with the least prime number that is a factor.

Repeat until the quotient is prime.

$45 = 3 \times 3 \times 5$ _or_ $3^2 \times 5$

FACTOR LADDERS

$5 \lfloor 125$

$5 \lfloor 25$

5

Begin with the least prime number that is a factor.

Repeat until the quotient is prime.

$125 = 5 \times 5 \times 5$ *or* 5^3