

4.2 Factors And Simplest Form

Recall

$$\begin{array}{rclcl} 12 & = & 4 & \times & 3 \\ \text{Product} & = & \text{Factor} & \times & \text{Factor} \end{array}$$

Def. A **prime number** is a natural number greater than 1 whose only factors are 1 and itself.
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...

Def. A **composite number** is a natural number greater than 1 that is not prime.

* Divisibility Test

A whole number is divisible by:

Divisor	Rule	Example
2	If the last digit is 0, 2, 4, 6, 8	
3	If the sum of the digits is divisible by 3	$405 \rightarrow 4 + 0 + 5 = 9$
4	If the last two digits are divisible by 4	$49832 \rightarrow 32$
5	If the last digit is 0 or 5	
7	If subtracting two times the last digit from the rest is divisible by 7	$483 \rightarrow 48 - (2 \times 3) = 42$
11	If the result of adding and subtracting digits in an alternating pattern is divisible by 11	$3729 \rightarrow 3 - 7 + 2 - 9 = -11$

* Prime factorization

Def. When a composite number is written as a product of prime numbers, this product is called the **prime factorization** of the number.

Ex 1. Find the prime factorization of each number.

a. 72

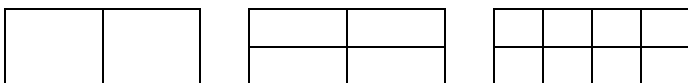
b. 56

c. 297

d. 5929

e. 15463

Def. Fractions that represent the same portion of a whole are called **equivalent fractions**.



*** Writing fractions in simplest form**

Def. A fraction is written in **simplest form** or **lowest terms** when the numerator and the denominator have no common factors other than 1.

Def. The process of writing a fraction in simplest form is called **simplifying** the fraction.

Ex 2. Simplify.

a. $\frac{30}{45}$

b. $\frac{39x}{51}$

c. $-\frac{9}{50}$

d. $\frac{49}{112}$

e. $-\frac{64}{20}$

f. $\frac{7a^3}{56a^2}$

g. $-\frac{72c^3d^2}{26c^2d^5}$

h. $\frac{30x^4y^7z^3}{108x^2y^3z^6}$