REDUCING FRACTIONS

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FUNDAMENTAL THEOREM OF ARITHMETIC: Indicates that each composite number, greater than 1, can be expressed as a product of prime numbers, in one and only one way, apart from the order of the factors.

PRIME NUMBERS: They are those numbers greater than 1, that are divisible between themselves and 1.

$$\mathbb{P} = \{2, 3, 5, 7, 11, 13, 17, 19, 23 \ldots\}$$

COMPOSITE NUMBERS: They are those natural numbers greater than 1 that are not prime.

$$\mathbb{A} = \{4,6,8,9,10,12,14,15,16,18,20 \ldots\}$$

NOTE: A number is divisible by 2 if it ends in 0, 2, 4, 6, 8.
NOTE: A number is divisible by 3 if the sum of its digits is divisible by 3.
NOTE: A number is divisible by 5 if it ends in 0 or 5.

EXAMPLE: Find all the prime factors of 30:

30	÷ 2
15	÷ 3
5	÷ 5
1	

$2 \times 3 \times 5 = 30$

CONCLUSION: The prime factors of 30 are 2, 3, and 5.

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EQUIVALENT FRACTIONS

If $\frac{p}{q} \wedge \frac{r}{s} \in \mathbb{Q}; \Longrightarrow \boxed{\frac{p}{q} = \frac{r}{s}} \Leftrightarrow \boxed{ps = qr}$

Hence, if

$$\frac{p}{q} \in \mathbb{Q} \wedge k \in \mathbb{I}, k \neq 0, \Longrightarrow \boxed{\frac{p}{q} = \frac{kp}{kq}}$$

They represent the same quantity without sharing the same numerator and denominator ⇦ EQUIVALENT FRACTIONS

To **simplify a fraction** and obtain an **equivalent fraction** we must:

a) Find all the prime factors of the numerator and denominator.
b) Cancel identical factors (cancel the G. C. D.).

GREATEST COMMON DIVISOR (G. C. D.): is the largest integer that divides a set of numbers. Is calculated by:

a) Find all the prime factors of each number.
b) The product of the prime numbers contained in "all" the numbers of the set, will be the G. C. D.

EXAMPLE: Simplify the following fraction: $\frac{10}{15} =$

SOLUTION: 1) Find all the prime factors of the numerator and denominator:

$$\frac{10}{15} = \frac{2x5}{3x5} =$$

2) Canceling identical factors (GCD):

$$\frac{2x5}{3x5} = \frac{2}{3} \cdot \frac{5}{5} = \frac{2}{3} \Rightarrow \frac{10}{15} = \frac{2}{3}$$ } EQUIVALENT FRACTIONS

EXAMPLE: Find the G. C. D. of 12, 20, and 28:

12	2	20	2	28	2
6	2	10	2	14	2
3	3	5	5	7	7
1		1		1	

The G. C. D. of 12, 20, and 28 is: 2x2=4