

Date: _____

Unit 2: Exponents & Roots

2.1 – Factor Trees, GCF, & LCM

Prime Numbers: Numbers with only two distinct factors of 1 and itself.

Ex. $2, 3, 5, 7, \cancel{8}, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43 \dots$
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only even prime

Composite Numbers: Numbers with more than two factors.

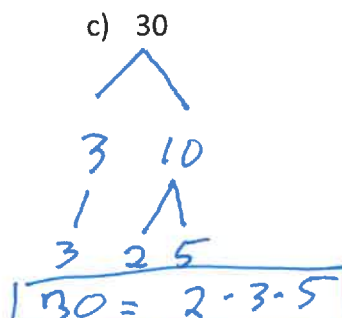
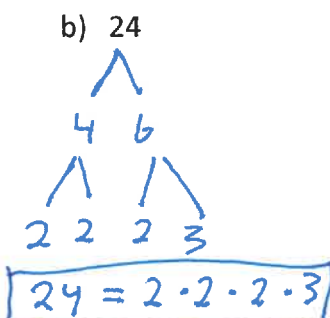
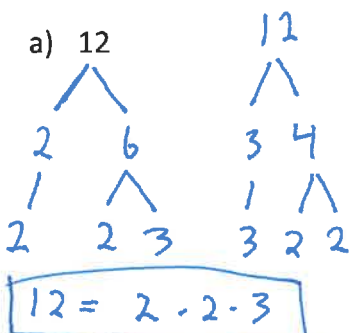
Ex. $\cancel{4}, 6, 8, 9, 10, 12, 14, 15, 16 \dots$

Prime Factorization: Expressing a composite number as a product of prime factors.

Ex. $10 = 2 \cdot 5$ $8 = 2 \cdot 2 \cdot 2$

A **factor tree** is useful to prime factor a number.

Ex. Use a factor tree to find the prime factorization of each given number:



Greatest Common Factor (GCF): The largest common factor among a group of two or more numbers.

Ex. Use prime factorization to identify the GCF in each group of numbers:

a) 12 and 24

$$12 = 2 \cdot 2 \cdot 3$$

$$24 = 2 \cdot 2 \cdot 2 \cdot 3$$

GCF = multiply the
common factors
together

$$= 2 \cdot 2 \cdot 3$$

$$\text{GCF} = 12$$

b) 24 and 30

$$24 = 2 \cdot 2 \cdot 2 \cdot 3$$

$$30 = 2 \cdot 3 \cdot 5$$

$$\text{GCF} = 2 \cdot 3$$

$$\text{GCF} = 6$$

c) 12, 24, and 30

$$12 = 2 \cdot 2 \cdot 3$$

$$24 = 2 \cdot 2 \cdot 2 \cdot 3$$

$$30 = 2 \cdot 3 \cdot 5$$

$$\text{GCF} = 2 \cdot 3$$

$$\text{GCF} = 6$$

Least Common Multiple (LCM): The smallest common multiple among a group of two or more numbers.

Ex. Use prime factorization to identify the LCM in each group of numbers:

a) 12 and 24

$$\begin{array}{l} 12 = 2 \cdot 2 \cdot 3 \\ 24 = 2 \cdot 2 \cdot 2 \cdot 3 \end{array}$$

LCM = multiply all factors but only once for any common factor

$$= 2 \cdot 2 \cdot 2 \cdot 3$$

$$\text{LCM} = 24$$

b) 24 and 30

$$\begin{array}{l} 24 = 2 \cdot 2 \cdot 2 \cdot 3 \\ 30 = 2 \cdot 3 \cdot 5 \end{array}$$
$$\text{LCM} = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$$
$$\text{LCM} = 120$$

c) 12, 24, and 30

$$\begin{array}{l} 12 = 2 \cdot 2 \cdot 3 \\ 24 = 2 \cdot 2 \cdot 2 \cdot 3 \\ 30 = 2 \cdot 3 \cdot 5 \end{array}$$
$$\text{LCM} = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$$
$$\text{LCM} = 120$$