

FACTORS

A factor is a number that is multiplied by another number to equal a product.

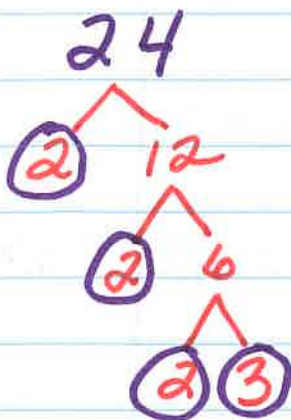
$$3 \times 8 = 24$$

$$6 \times 4 = 24$$

$$1 \times 24 = 24$$

$$2 \times 12 = 24$$

Prime Factorization - expressing a composite number as a product of its prime factors.



$$24 = 2 * 2 * 2 * 3$$

Prime Numbers

Only 2

factors...

1 and itself:

$$3 = 3 \times 1$$

$$5 = 5 \times 1$$

$$7 = 7 \times 1$$

$$11 = 11 \times 1$$

$$2 = 2 \times 1$$

$$23 = 23 \times 1$$

Composite Numbers

More than 2

different factors:

$$4 = 4 \times 1 \text{ and } 2 \times 2$$

$$6 = 6 \times 1 \text{ and } 2 \times 3$$

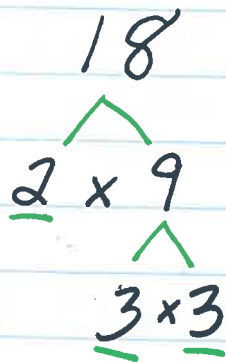
$$9 = 9 \times 1 \text{ and } 3 \times 3$$

$$20 = 20 \times 1 \text{ and } 4 \times 5 \\ \text{and } 2 \times 10$$

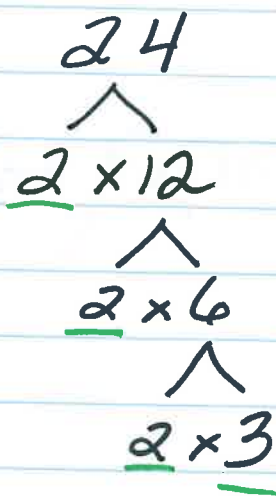
$$45 = 45 \times 1 \text{ and } 9 \times 5$$

$$21 = 21 \times 1 \text{ and } 3 \times 7$$

Factor Trees



The Prime Factorization of 18 is $2 \times 3 \times 3$



The Prime Factorization of 24 is $2 \times 2 \times 2 \times 3$

Factor Ladders

$$\begin{array}{r|l} 2 & 60 \\ 2 & 30 \\ 3 & 15 \\ & 5 \end{array} \quad \begin{array}{l} \text{Divide by Prime factor } 2 \\ \text{Divide by Prime factor } 2 \\ \text{Divide by Prime Factor } 3 \end{array}$$

The Prime Factorization of 60 is $2 \times 2 \times 3 \times 5$

$$\begin{array}{r|l} 2 & 18 \\ 3 & 9 \\ & 3 \end{array} \quad \begin{array}{l} \text{Divide by Prime factor } 2 \\ \text{Divide by Prime factor } 3 \end{array}$$

The Prime Factorization of 18 is $2 \times 3 \times 3$

Greatest Common Factor

GCF

1. List all the factors. (You can count like the Count!)
2. Circle the common factors.
3. Choose the greatest.

18 → ①, 18, ②, 9, ③, ⑥

24 → ①, 24, ②, 12, ③, 8, 4, ⑥

The greatest common factor
of 18 and 24 is 6.

Least
Common
Multiple

LCM

1. Count up by each number.
2. Circle the common numbers.
3. Choose the least.

6 \rightarrow 6, 12, 18, 24, 30, 36, 42, 48, 54

5 \rightarrow 5, 10, 15, 20, 25, 30, 35, 40

The Least Common Multiple
of 6 and 5 is 30.

Squares

$$4^2 = 4 \times 4 = 16$$

$$9^2 = 9 \times 9 = 81$$

$$5^2 = 5 \times 5 = 25$$

Cubes

$$4^3 = 4 \times 4 \times 4 = 64$$

$$3^3 = 3 \times 3 \times 3 = 27$$

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

Square Roots

$$\sqrt{16} = 4$$

$$\sqrt{81} = 9$$

$$\sqrt{25} = 5$$

Cube Roots

$$\sqrt[3]{64} = 4$$

$$\sqrt[3]{27} = 3$$

$$\sqrt[3]{125} = 5$$

$$6^3 + 4^2$$

$$216 + 16$$

$$232$$

P
E
M
D
A
S

$$7^2 + 6^3 \div 2^3$$

$$49 + \frac{216}{8}$$

$$49 + 27$$

$$76$$