

Prime Numbers

Prime Numbers

A Prime Number can be divided evenly **only** by 1 & itself.
And it must be a whole number greater than 1.

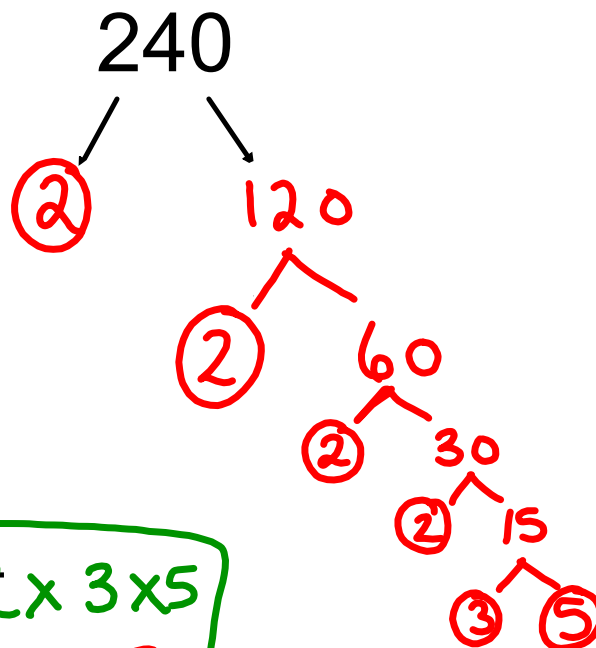
The first few prime numbers are 2, 3, 5, 7, 11, 13, 17 etc.....

Determining the Prime Factors of a Whole Number

Primes: 2, 3, 5, 7, 11, 13, ...

Write the prime factorization of 240

Draw a Factor
Tree !!

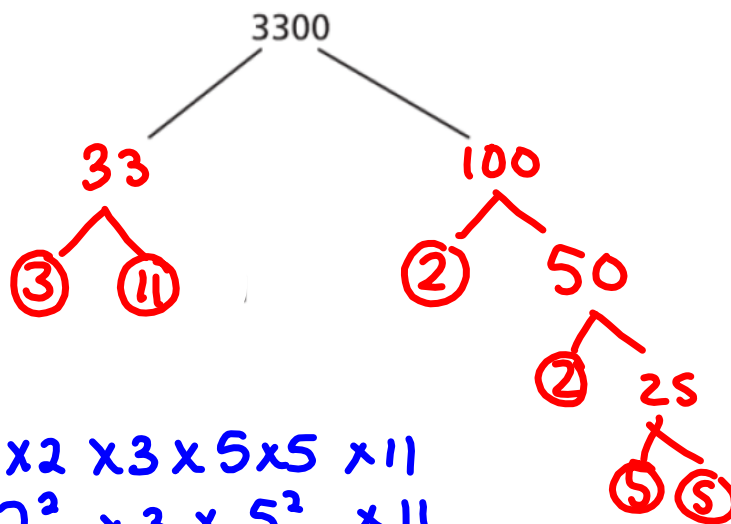


$$240 = \underbrace{2 \times 2 \times 2 \times 2}_{2^4} \times 3 \times 5$$

The Prime Factorization of 240 is:
 $2 \times 2 \times 2 \times 3 \times 5 \times 2$ or $2^4 \times 3 \times 5$

The Prime Factors of 240 are:
 2, 3, & 5

Write the prime factorization of 3300 and the factors



$$3300 = 2 \times 2 \times 3 \times 5 \times 5 \times 11$$

$$= 2^2 \times 3 \times 5^2 \times 11$$

The prime factors of 3300 are 2, 3, 5, 11,

The prime factorization of 3300 is: $2 \times 2 \times 3 \times 5 \times 5 \times 11$

or $2^2 \times 3 \times 5^2 \times 11$

Finding Factors

What is a "Factor" ?

Factors are the numbers you multiply together to get another number:

$$\begin{array}{c} 2 \times 3 = 6 \\ \text{Factor} \nearrow \quad \searrow \text{Factor} \end{array}$$

Sometimes we need to find all of the factors of a number:

Find all the factors of 12:


the factors of 12 are

Because:

Factors of 12

$$\begin{array}{r} 12 \\ \hline 1 \times 12 \\ 2 \times 6 \\ 3 \times 4 \end{array}$$

Factor of 12 are
1, 2, 3, 4, 6, 12



Lets try some bigger numbers!

Determine all of the factors of 132

132

$$1 \times 132$$

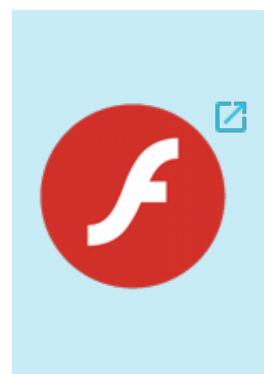
$$2 \times 66$$

$$3 \times 44$$

$$4 \times 33$$

$$6 \times 22$$

$$11 \times 12$$



Lets try some bigger numbers!

Determine all of the factors of 132

$$132 \div 1 = 132$$

$$132 \div 2 = 66$$

$$132 \div 3 = 44$$

$$132 \div 4 = 33$$

$$132 \div 6 = 22$$

$$132 \div 11 = 12$$

These
are the
factors
of 132!

The Factors of 132 are : 1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132

Lets try some bigger numbers!

Determine all of the factors of 162

Lets try some bigger numbers!

162

Determine all of the factors of 162

$$\begin{array}{l} 1 \times 162 \\ 2 \times 81 \\ 3 \times 54 \\ 6 \times 27 \\ 9 \times 18 \end{array}$$

$$162 \div 1 = 162$$

$$162 \div 2 = 81$$

$$162 \div 3 = 54$$

$$162 \div 6 = 27$$

$$162 \div 9 = 18$$

These are the
factors of 162!

The Factors of 162 are : 1, 2, 3, 6, 9, 18, 27, 54, 81, 162

GCF

When Comparing 2 or More Numbers....

GCF - Greatest Common Factor

Is the largest COMMON number that will divide into each



- you can list the factors or use prime factorization trees

Prime Factorization

Ex) $GCF(6, 12) = 6$

$$\begin{array}{r} \underline{12} \\ 1 \times 12 \\ 2 \times 6 \\ 3 \times 4 \end{array}$$

$$\begin{array}{r} \underline{6} \\ 1 \times 6 \\ 2 \times 3 \end{array}$$

$$6 = 1, 2, 3, \textcircled{6}$$

$$12 = 1, 2, 3, 4, \textcircled{6}, 12$$

Underline the common primes (then multiply them and that give you the GCF)

LCM

When Comparing 2 or More Numbers....

LCM - Lowest Common Multiple

Is the largest COMMON multiple

- you can list the multiples of each number and circle the common multiple that fall in all list Prime Factorization

or

use prime factorization trees

- use maximum # of primes in each list

WATCH The video for description

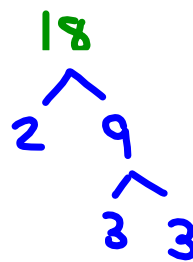
<https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/adding-and-subtracting-rational-expressions/v/least-common-multiple-exercise>



Ex) GCF (18, 12) = ? 6

$$\begin{array}{r} 18 \\ 1 \times 18 \\ 2 \times 9 \\ 3 \times 6 \end{array}$$

$$\begin{array}{r} 12 \\ 1 \times 12 \\ 2 \times 6 \\ 3 \times 4 \end{array}$$



$$18 = \underline{2} \times \underline{3} \times \underline{3}$$



$$12 = \underline{2} \times \underline{2} \times \underline{3}$$

$$\text{LCM}(18, 12) = 36$$

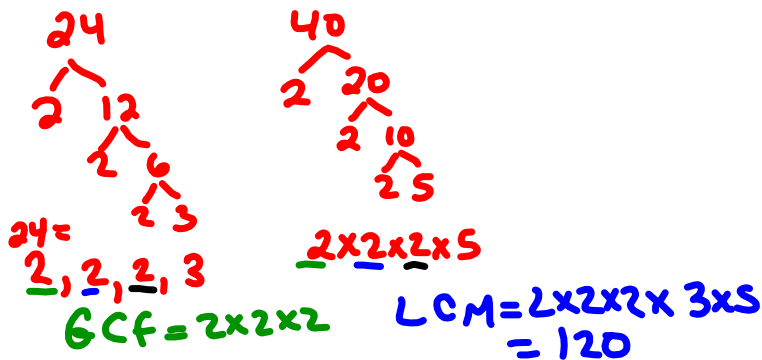
$$18 \rightarrow 18, \underline{36}, 54, 72, 90, 108$$

$$12 \rightarrow 12, 24, \underline{36}, 48, 60, 72$$

Both have
50 + take largest
power of each

Worksheet

1)) Find the

a) GCF (24, 40) ^{= 8} b) GCF (84, 60) c) GCF (36, 90, 126)

1)) Find the

a) LCM (15,40) b) LCM (12,15) c) LCM (9, 14, 63)

