Prime Numbers

Prime Numbers

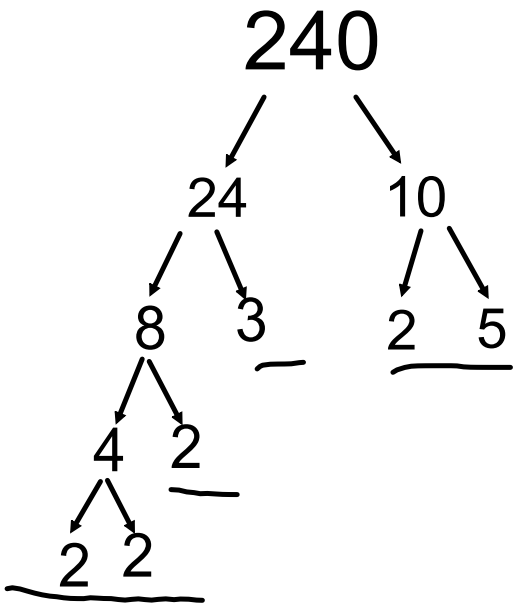
A Prime Number can be divided evenly **only** by 1 & itself.
And it must be a whole number greater than 1.

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

Determining the Prime Factors of a Whole Number

Write the prime factorization of 240

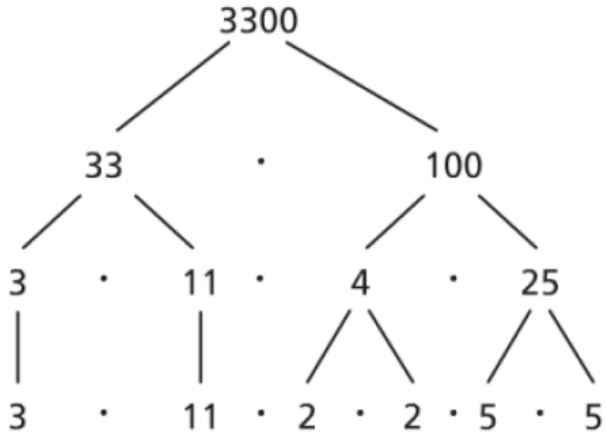
Draw a Factor Tree !!



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

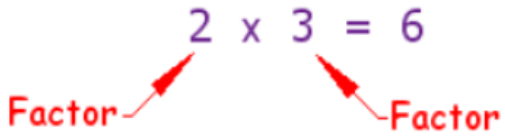


The prime factors of 3300 are 2, 3, 5, and 11.
The prime factorization of 3300 is: $2 \cdot 2 \cdot 3 \cdot 5 \cdot 5 \cdot 11$,
or $2^2 \cdot 3 \cdot 5^2 \cdot 11$

Finding Factors

What is a "Factor" ?

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



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

Find all the factors of 12:
the factors of 12 are 1, 2, 3, 4, 6, 12

Because: 1 x 12 = 12
2 x 6 = 12
3 x 4 = 12

Lets try some bigger numbers!

Determine all of the factors of 132

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!

Determine all of the factors of 162

$162 \div 1 = 162$
$162 \div 2 = 81$
$162 \div 3 = 54$
$162 \div 6 = 27$
$162 \div 9 = 18$

These are the factors of 162!

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

Notice Anything?

They all have something in

common!

hat 

What do these 3 items have in common?

Eggs, **Eyes,** **A Load of Laundry**

Whites

What do these 3 items have in common?

Florida,

A Locksmith

A Piano

They have keys

What do these 3 items have in common?

Frosty the snowman

Wicked witches of the west

Ice Cream

They melt

What do these 3 items have in common?

A Light

Blue Jeans

Memories

They fade over time

What do these 3 items have in common?

Hard

Salt

Distilled

Types of water

Common Factoring

for the Greatest Common Factor
GCF

Review of GCF

Find the GCF for the following pairs of numbers:

1) 6 and 12

1x6 1x12
2x3 2x6
3x4

1, 2, 3, 6

2) 6 and 21

1x6 1x21
2x3 7x3

1, 3

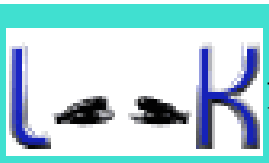
3) 30 and 21

1x30 1x21
2x15 7x3
3x10
6x5

1, 3

144 :

126 :



for the Greatest Common Factor
GCF

Find the GCF of 36 and 54.

The factors of 36 are **1**, **2**, **3**, 4, **6**, **9**, 12, **18**, and 36.

The factors of 54 are **1**, **2**, **3**, **6**, **9**, **18**, 27, and 54.

The **common factors** of 36 and 54 are **1, 2, 3, 6, 9, 18**

Although the numbers in **bold** are all common factors of both 36 and 54, **18** is the greatest common factor.

What is a Common Factor?

We said that .....

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

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

The common factors are the ones found in both lists.

Therefore: The common factors of 132 & 162 are 1, 2, 3, 6

What is the Greatest Common Factor?

The Greatest Common Factor is simply
the greatest of the common factors.

The common factors of 132 & 162 are: 1, 2, 3, 6

The Greatest Common Factor of 132 & 162 is 6.

Just another Method

Using Prime Factors to Solve GCF of Numbers

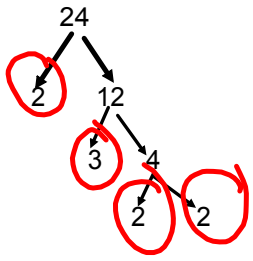
Steps:
1) Find the prime factors of each number

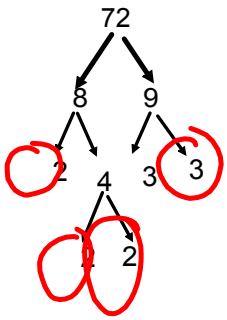
2) Compare the prime factors of each number

3) Circle the prime factors that each number has in common

4) Multiply common prime factors together to get GCF of #'s

Example:
Find the GCF of 24 and 72





2 x 2 x 2 x 3

2 x 2 x 2 x 3 x 3

2x2x2x3

24

What is the Least Common Multiple?

The least common multiple is the least multiple that is the same for two or more numbers.

The Least Common Multiple

Determine the least common multiple of 18, 20, and 30

Step #1 Write the prime factorization of each number.

Step #2 Circle the greatest power of each prime number.

Step #1 Write the prime factorization of each number.

18 = $2 \times 3 \times 3 = 2 \times 3^2$

20 = $2 \times 2 \times 5 = 2^2 \times 5$

30 = $2 \times 3 \times 5 = 2 \times 3 \times 5$

Step #2 **Circle the greatest power of each prime number.**

$$18 = 2 \cdot 3 \cdot 3 = 2 \cdot \mathbf{3}^2$$
$$20 = 2 \cdot 2 \cdot 5 = \mathbf{2}^2 \cdot 5$$
$$30 = 2 \cdot 3 \cdot \mathbf{5}$$

Solution: $2^2 \cdot 3^2 \cdot 5 = 4 \cdot 9 \cdot 5$
$= 180$

Homework

Exercises

Pg. 140

A

3 4 a, b, c 5 a, b, c

B

6 a, c, e 7 8 9 a,c 10 a,c,e 11 12 13

14 15 a,d 16 a,d 17 18 19 20

C

21 22