

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.

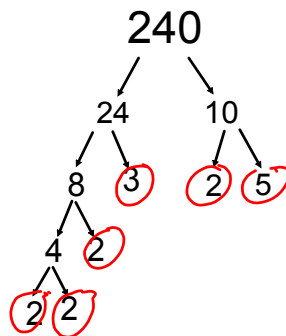
The first few prime numbers are 2, 3, 5, 7, 11, 13, 17 etc.....

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Determining the Prime Factors of a Whole Number

Write the prime factorization of 240

Draw a Factor Tree !!



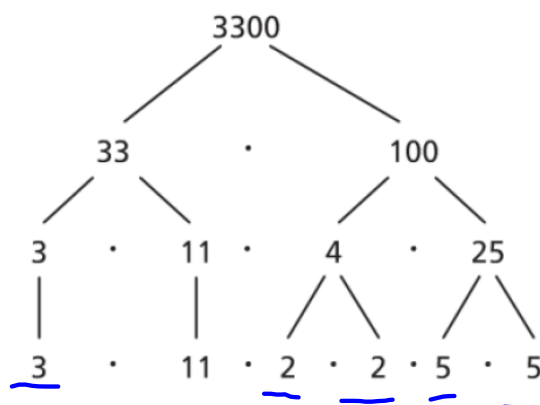
The Prime Factorization of 240 is:
 $2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 2$ or $2^4 \times 3 \times 5$

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

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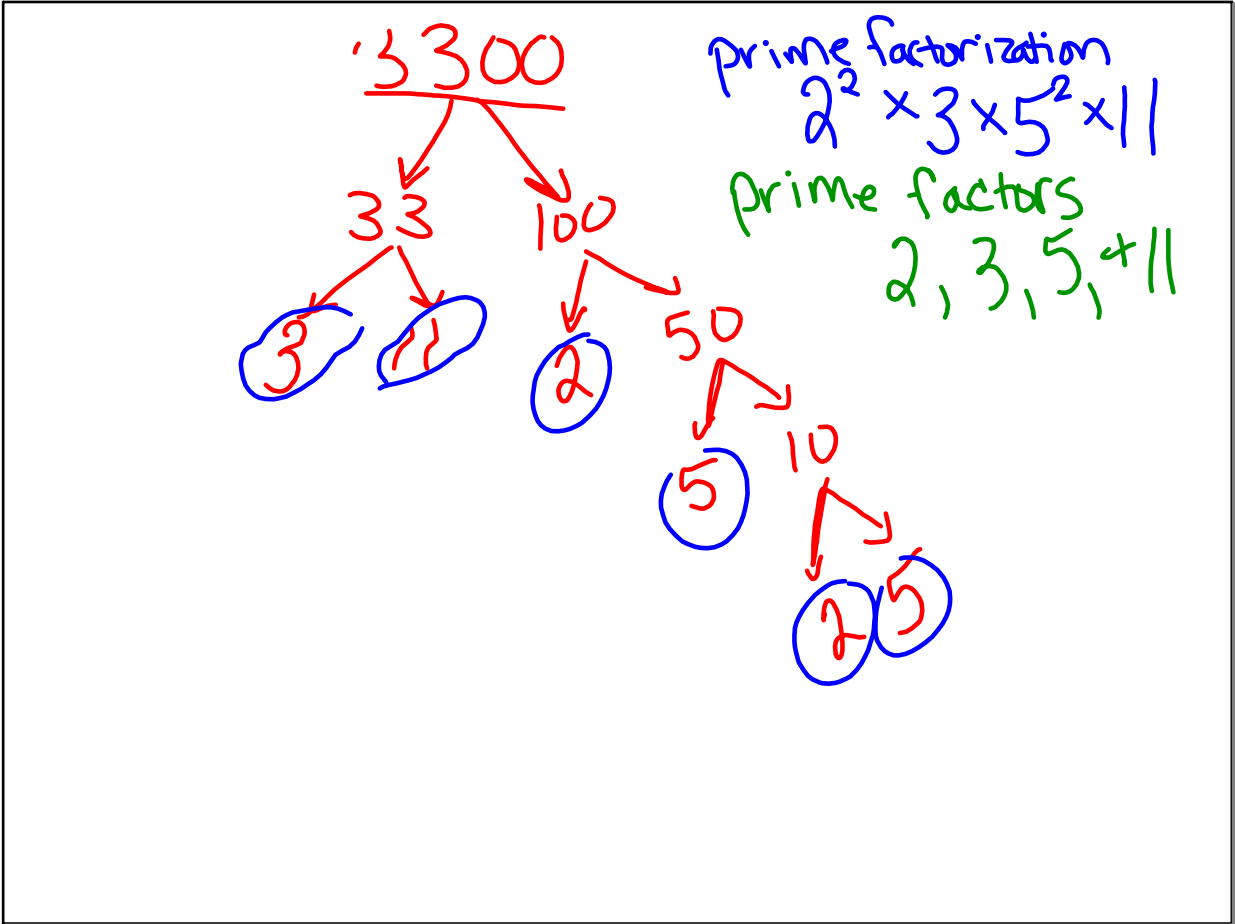
Write the prime factorization of 3300 and the factors



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 $2^2 \cdot 3 \cdot 5^2 \cdot 11$

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Finding Factors

What is a "Factor" ?

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

$$\begin{array}{ccc} & 2 \times 3 = 6 & \\ \text{Factor} \swarrow & & \searrow \text{Factor} \end{array}$$

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

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

Because: $1 \times 12 = 12$
 $2 \times 6 = 12$
 $3 \times 4 = 12$

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

$$\begin{array}{r} 64 \\ 1 \overline{)64} \\ 1 \times 64 \\ 2 \times 32 \\ 4 \times 16 \\ 8 \times 8 \end{array}$$

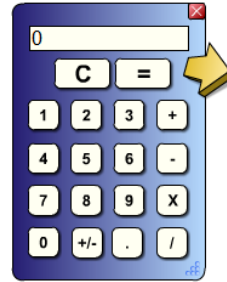
1, 2, 4, 8, 16, 32, 64

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Lets try some bigger numbers!

Determine all of the factors of 132

$$\begin{array}{l}
 \underline{132} \quad 1 \\
 1 \times 132 \\
 2 \times 66 \\
 3 \times 44 \\
 4 \times 33 \\
 \underline{6 \times 22} \\
 12 \times 11
 \end{array}$$



$$11 \times 12$$

prim
 $\frac{2 \times 3 \times 11}{}$

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GCF → Greatest Common Factor
 ↑

$$\begin{array}{l}
 \underline{36} \\
 1 \times 36 \\
 2 \times 18 \\
 3 \times 12 \\
 4 \times 9 \\
 6 \times 6
 \end{array}$$

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

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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

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Lets try some bigger numbers!

Determine all of the factors of 162

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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

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Common Factoring



for the Greatest Common Factor
GCF

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LOOK 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**.

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$$\begin{array}{l}
 36 \\
 \hline
 1 \times 36 \\
 2 \times 18 \\
 3 \times 12 \\
 4 \times 9 \\
 6 \times 6
 \end{array}$$

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

1, 2, 3, 4, 9, 18, 27, 54

1, 2, 3, 4, 6, 9, 12, 18, 36

Mar 14-10:26 AM

④

$a - c$

⑤

prime factorization

$a - c$

⑥

$a - c$

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