

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.....

Prime Numbers

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1) Write out the numbers from 1 to 100 in ten rows of 10.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2) Cross off number 1, because all primes are greater than 1.

3) Number 2 is a prime, so we can keep it, but we need to cross off the multiples of 2 (i.e. even numbers).

4) Number 3 is also a prime, so again we keep it and cross off the multiples of 3.

5) The next number left is 5 (because four has been crossed off), so we keep it and cross off the multiples of this number.

6) The final number left in the first row is number 7, so cross off its multiples.

7) You have finished. All of the "surviving" numbers (coloured in white below) on your grid are prime numbers.

Prime Numbers

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

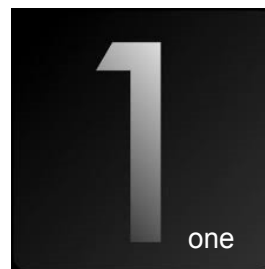
A prime number
can only be divided
evenly by
one and itself.

The following are NOT Prime Numbers



1×0
 2×0
 3×0
etc.

Zero
has one an infinite
number of factors.



1×1

One only
has one factor...
1

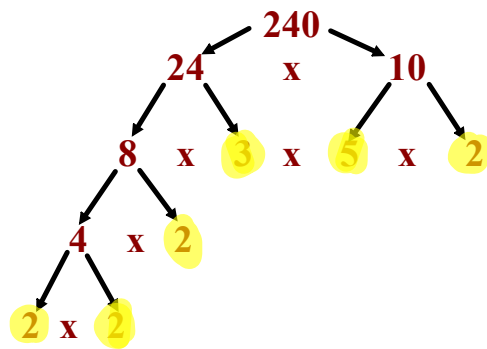


Determining the Prime Factors of a Whole Number



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



Determining the Prime Factors of a Whole Number



Write the prime factorization of 240.

$$240 \rightarrow 2 \times 2 \times 2 \times 2 \times 3 \times 5$$

The Prime Factorization of 240 is:

$$2 \times 2 \times 2 \times 3 \times 5 \times 2 \quad \text{or} \quad 2^4 \times 3 \times 5$$

The Prime Factors of 240 are:

2, 3, & 5

Write the prime factorization of 3300.

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

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

Write the prime factorization of 12600.


$$12600 \longrightarrow 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7$$

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

You Try...

Write the prime factorization of 6615.

$$6615 \longrightarrow 3 \times 3 \times 3 \times 5 \times 7 \times 7$$


Don't forget to
check your answer!!

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:

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

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

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

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

? ? ? ?

What is a 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.

Using prime factorization find the GCF of ...




$$18 \rightarrow 2 \times 3 \times 3$$
$$24 \rightarrow 2 \times 2 \times 2 \times 3$$

$$2 \times 3$$
$$\text{GCF} = 6$$

Using prime factorization find the GCF of ...



$$\begin{array}{l} 12 \rightarrow 2 \times 2 \times 3 \\ 36 \rightarrow 2 \times 2 \times 3 \cdot 3 \\ 90 \rightarrow 2 \times 3 \times 3 \times 5 \\ \text{GCF} = 2 \times 3 \\ 6 \end{array}$$


GCF

360 → $2 \times 2 \times 2 \times 3 \times 3 \times 5$

310 → $2 \times 5 \times 31$

2×5
 $= 10$