

UNIT 2: MULTIPLES AND FACTORS OF A NUMBER

The **multiples** of a number are simply its *times table*

Example: the multiples of 2 are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, ...

The **factors** of a numbers are all the numbers that *divide into it*

Example: the factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24.

THE WAY TO FIND ALL FACTORS OF A NUMBER

Find all the factors of 24

Start off with $1 \times$ the number itself, then try $2 \times$ the number , then $3 \times$ the number and so on

$1 \times 24 = 24$
$2 \times 12 = 24$
$3 \times 8 = 24$
$4 \times 6 = 24$
$5 \times ? = 24$
$6 \times 4 = 24$

listing the pair in rows like this, try each one in turn and put a dash if it doesn't divide exactly. When you get a number repeated you stop

So, the factors of 24 are: 1, 2, 3, 4, 8, 12, and 24.

Exercises

1. – Write the first five multiples of 7, 8, 9, 12, 16,

Numbers	Multiples
7	
8	
9	
12	
16	

2. – Find all the factors of 12, 56, 64 and 81

PRIME AND COMPOUND NUMBERS

Prime number

It is a number larger than 1 which can only be divided by itself.

Example: 2, 3, 5, 7, 11, 13, 17, 19, ...

As you can see:

The only numbers that will multiply to make 7 are 1×7

The only numbers that multiply to make 13 are 1×13

In fact the only way to get *any prime number* is $1 \times \text{itself}$

	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 is not a prime number
- The first four prime numbers are 2, 3, 5 and 7
- 2 and 5 are the exceptions because all the rest end in 1, 3, 7 or 9
- But not all numbers ending in 1, 3, 7 or 9 are primes; only the black ones are primes.

Compound number

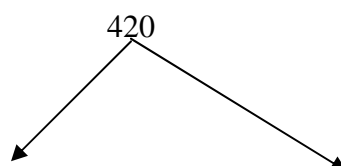
Compound numbers are all the numbers that come up in times table.

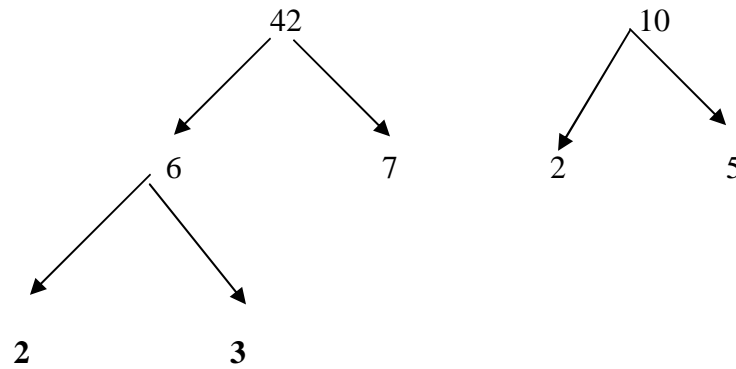
Example: 4, 8, 9, 10, 12, 14, 15,

EXPRESSING NUMBERS AS A PRODUCT OF PRIME FACTOR

Any number can be broken down into a string of prime numbers, all multiplied together. This is called *expressing a numbers as a product of prime factors*.

Factor tree method





Where you start at the top and split your number off into factors as shown. Each time you get a prime you circle it and you finally end up with all the prime factors, which can be arranged in order.

$$420 = 2 \times 2 \times 3 \times 5 \times 7$$

Exercises

Express as product of prime factors

- a) 990 b) 160

HIGHEST COMMON FACTOR (GCF)

The highest common factor (HCF) is the largest factor between two numbers

To find the HCF for two numbers:

- 1) Find the factors for each number
- 2) Compare the factors and identify the largest numbers they have in common.

Example:

Find the HCF for 9 and 12

Factor of 9: 1, **3** and 9

Factor of 12: 1, 2, **3**, 4, 6 and 12

So the HCF for 9 and 12, is 3

LOWEST COMMON MULTIPLE

The least common multiple (LCM) is the smallest multiple that two numbers have in common

To find LCM for two numbers:

- 1) Find the multiples for each number
- 2) Identify the lowest number which appeared in both multiplication table.

Example

Find the LCM for 2 and 3

Multiples for 2: 2, 4, **6**, 8, 10, **12**, 14, 16, 18, 20, 22, **24** ...

Multiples for 3: 3, **6**, 9, **12**, 15, 18, **24**, 27, 30 ...

The common multiples are: 6, 12, 24 ...

So the LCM for 2 and 3, is 6

Exercises

- a) List the first ten multiples for 7 and 9. What is their LCM?
- b) List all the factors for 36 and 84. What is their HCF?