# PRIME NUMBERS

1

## Prime Numbers

Prime numbers are numbers with **exactly** two factors: themselves and 1.

**17**
has only 2 factors: 1 and 17
so 17 is a prime number.

**4**
has 3 factors: 1, 2 and 4
so 4 is not a prime number.

The prime numbers under 20:
2, 3, 5, 7, 11, 13, 17 and 19.

# SQUARE NUMBERS

2

## Square Numbers

A square number is the result when a number has been multiplied by itself.

For example, 3 x 3 = 9,
so 9 is a square number.

The squared symbol is $^2$,
so 6 x 6 can be written as $6^2$.

| | | | |
|---|---|---|---|
| $1^2$ | = | 1 x 1 | = 1 |
| $2^2$ | = | 2 x 2 | = 4 |
| $3^2$ | = | 3 x 3 | = 9 |
| $4^2$ | = | 4 x 4 | = 16 |
| $5^2$ | = | 5 x 5 | = 25 |
| $6^2$ | = | 6 x 6 | = 36 |
| $7^2$ | = | 7 x 7 | = 49 |
| $8^2$ | = | 8 x 8 | = 64 |
| $9^2$ | = | 9 x 9 | = 81 |
| $10^2$ | = | 10 x 10 | = 100 |
| $11^2$ | = | 11 x 11 | = 121 |
| $12^2$ | = | 12 x 12 | = 144 |

# CUBE NUMBERS

3

## Cube Numbers

A cube number is the result when a number has been multiplied by itself twice.

For example, 2 x 2 x 2 = 8,
so 8 is a cube number.

The cubed symbol is $^3$,
so 2 x 2 x 2 can be written as $2^3$.

| | | | |
|---|---|---|---|
| $1^3$ | 1 x 1 x 1 | = | 1 |
| $2^3$ | 2 x 2 x 2 | = | 8 |
| $3^3$ | 3 x 3 x 3 | = | 27 |
| $4^3$ | 4 x 4 x 4 | = | 64 |
| $5^3$ | 5 x 5 x 5 | = | 125 |

# ROMAN NUMERALS

4

## Roman Numerals

| I | V | X | L | C | D | M |
|---|---|---|---|---|---|---|
| 1 | 5 | 10 | 50 | 100 | 500 | 1000 |

A numeral **after** a larger numeral means add it on.

| | | |
|---|---|---|
| 9 | IX | 10 - 1 |
| 12 | XII | 10 + 1 + 1 |
| 90 | XC | 100 - 10 |
| 700 | DCC | 500 + 100 + 100 |
| 2050 | MML | 1000 + 1000 + 50 |

A numeral **before** a larger numeral means take it away.

# FACTORS

5

## Factors

Factors are whole numbers that divide exactly into another number.

| 18 | 24 |
|---|---|
| 1 x 18 | 1 x 24 |
| 2 x 9 | 2 x 12 |
| 3 x 6 | 3 x 8 |
| The factors of 18 are | 4 x 6 |
| 1, 2, 3, 6, 9 and 18. | The factors of 24 are |
| | 1, 2, 3, 4, 6, 8, 12 and 24. |

# MULTIPLES

6

## Multiples

A multiple of a number is the result of multiplying that number by a whole number.

18 is a multiple of 3 as 3 x 6 = 18

28 is a multiple of 7 as 7 x 4 = 28

You can think of multiples as extended times tables.

Any even number is a multiple of 2.

Any number that ends in 5 or 0 is a multiple of 5.

# COMMON FACTORS

7

## Common Factors

When we list the factors of two numbers, we call the numbers that appear in both lists, common factors.

**For example....**

The factors of 12 are 1, 2, 3, 4, 6 and 12.

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

**So the common factors of 12 and 18 are 1, 2, 3 and 6.**

# COMMON MULTIPLES

8

## Common Multiples

When we list the multiples of two numbers, we call the numbers that appear in both lists, common multiples.

**For example....**

The first 8 multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24

The first 8 multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32

**So 12 and 24 are common multiples of 3 and 4.**

# BIDMAS

9

## BIDMAS

Use **BIDMAS** to remember the order to complete calculations.

| | | | | |
|---|---|---|---|---|
| B | Brackets | ( ) | Do brackets first | 5 x (4 + 5) = 45 |
| I | Indices | $3^2$ | Indices are next | 20 - $4^2$ = 4 |
| D | Division | ÷ | Now ÷ and x in the order they appear from left to right | 10 + 20 ÷ 5 = 14 |
| M | Multiplication | x | | 10 + 2 x 10 = 30 |
| A | Addition | + | Then + and - in the order they appear from left to right | 4 + 2 x 5 = 14 |
| S | Subtraction | - | | 20 - 6 x 3 = 2 |

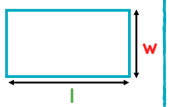
# AREA

10

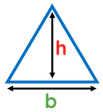
## Area

The area is the amount of space inside a 2D shape measured in square units (e.g $cm^2$ or $m^2$).

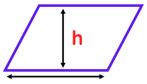
Area of a rectangle
length x width




Area of a triangle
(base x height) ÷ 2




Area of a parallelogram
base x height



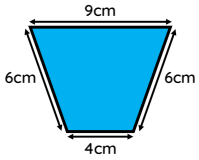

# PERIMETER

11

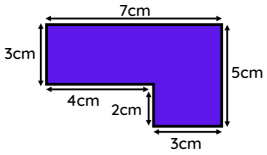
## Perimeter

The perimeter is the distance around the outside of a 2D shape.

Add all the sides of the shape to work out the perimeter.




9 + 6 + 4 + 6 = 25cm



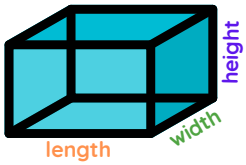

7 + 3 + 4 + 2 + 3 + 5 = 24cm

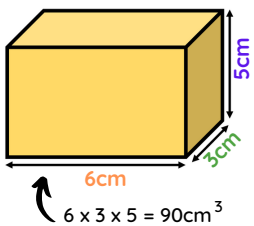
# VOLUME OF A CUBOID

12

## Volume of a cuboid

The volume of a cuboid is found by multiplying:
length x width x height



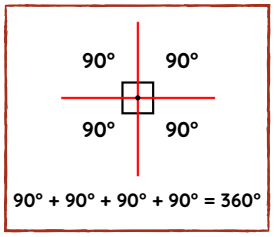

6 x 3 x 5 = $90cm^3$

# ANGLES AT A POINT

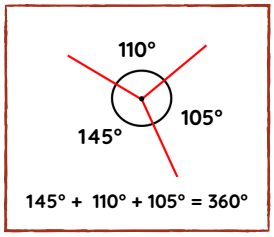
13

## Angles at a point

The angles around a point add up to 360°.




NOT TO SCALE

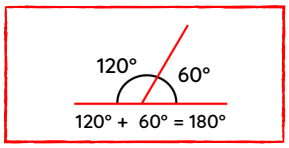



# ANGLES ON A STRAIGHT LINE

14

## Angles on a straight line

The angles on a straight line add up to 180°.

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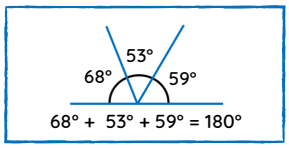
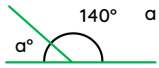



We can work out a missing angle by subtracting the angles we know from 180°.



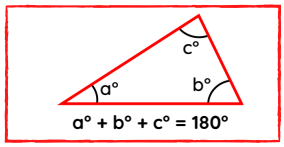

a = 180° - 140°
a = 40°

# ANGLES IN A TRIANGLE

15

## Angles in a triangle

The angles in a triangle add up to 180°.

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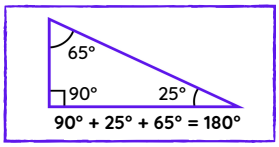
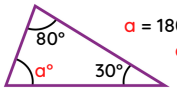



We can work out a missing angle by subtracting the angles we know from 180°.

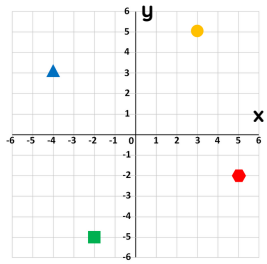



a = 180° - 80° - 30°
a = 70°

# COORDINATES

16

## Coordinates




When writing coordinates, we write the x-axis coordinate first and then the y-axis coordinate.

(-4 , 3)

(3 , 5)

(-2 , -5)

(5 , -2)

# THE MEAN

17

## The Mean

The mean is the average of the numbers.

To calculate the mean, add up all of the numbers then divide by how many numbers there are.

| 10, 7, 8, 7 | 2, 6, 9, 8, 3, 8 |
|---|---|
| 10 + 7 + 8 + 7 = 32 | 2 + 6 + 9 + 8 + 3 + 8 = 36 |
| 32 ÷ 4 = 8 | 36 ÷ 6 = 6 |
| Mean = 8 | Mean = 6 |

# PARALLEL AND PERPENDICULAR LINES

18

## Parallel and Perpendicular Lines

Parallel lines are lines that are an equal distance apart and will never meet.

Perpendicular lines are lines that cross each other at right angles.

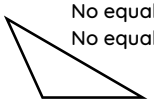
# TYPES OF TRIANGLE

19

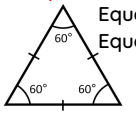
## Types of triangle

**Isosceles triangle**
Two equal angles
Two equal length sides

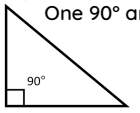
**Scalene triangle**
No equal angles
No equal sides



**Equilateral triangle**
Equal angles (60°)
Equal length sides




**Right-angled triangle**
One 90° angle




# TYPES OF ANGLE

20

## Types of angle

**Acute angle**
Less than 90°

**Obtuse angle**
Between 90° and 180°

**Right angle**
Exactly 90°

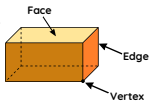
**Reflex angle**
Between 180° and 360°

# 3D SHAPES

21

## 3D Shapes

**Faces** - flat or curved surfaces of a 3D shape
**Edges** - where 2 faces meet
**Vertices** - corners where edges meet




| | Shape | Faces | Edges | Vertices |
|---|---|---|---|---|
| EXAMPLES | Square-based pyramid | 5 | 8 | 5 |
| | Cuboid | 6 | 12 | 8 |
| | Cylinder | 3 | 2 | 0 |
| | Cone | 2 | 1 | 1 |

# FRACTIONS, DECIMALS AND PERCENTAGES

22

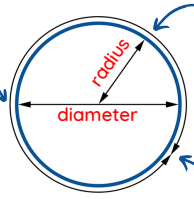
| Fractions | Decimals | Percentages |
|---|---|---|
| $\frac{1}{100}$ | 0.01 | 1% |
| $\frac{1}{10}$ | 0.1 | 10% |
| $\frac{1}{5}$ | 0.2 | 20% |
| $\frac{1}{4}$ | 0.25 | 25% |
| $\frac{1}{2}$ | 0.5 | 50% |
| $\frac{3}{4}$ | 0.75 | 75% |
| $\frac{1}{1}$ | 1 | 100% |

# PARTS OF A CIRCLE

23

## Parts of a circle

A circle's diameter is the distance from one edge to the other through the centre of the circle.




A circle's radius is the distance from the centre of the circle to the outer edge.

A circle's circumference is the distance around the edge.

# METRIC MEASURES

24

## Metric measures

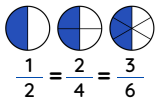
| | |
|---|---|
| **Capacity** | 1 litre = 1000 millilitres |
| **Weight** | 1 kilogram = 1000 grams |
| **Length** | 1 centimetre = 10 millimetres |
| | 1 metre = 100 centimetres |
| | 1 kilometre = 1000 metres |

# EQUIVALENT FRACTIONS

25

## Equivalent fractions

Equivalent fractions are fractions with different numbers representing the same part of a whole.



$\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$