

Place value in numbers to 1million

The position of the digit gives its size

Millions	Hundred thousands	Ten thousands	thousands	hundreds	tens	units
1	2	3	4	5	6	7

Example

The value of the digit '1' is 1 000 000

The value of the digit '2' is 200 000

The value of the digit '3' is 30 000

The value of the digit '4' is 4000

Round numbers to nearest 10, 100, 1000, 10000, 100000

Example 1- Round 342 679 to the nearest 10 000

- Step 1 - Find the 'round-off digit' - 4
- Step 2 - Look one digit to the right of 4 - 2

5 or more? NO - leave 'round off digit' unchanged
 - Replace following digits with zeros
ANSWER - 340 000

Example 2- Round 453 679 to the nearest 100 000

- Step 1 - Find the 'round-off digit' - 4
- Step 2 - Look one digit to the right - 5

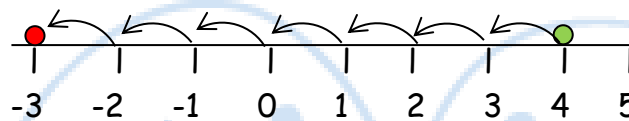
5 or more? YES - add one to 'round off digit'
 - Replace following digits with zeros
ANSWER - 500 000

Negative numbers

A number line is very useful for negative numbers.

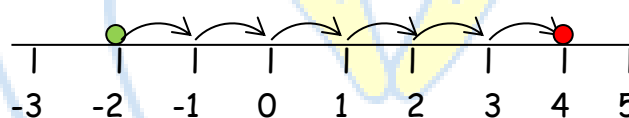
- The number line below shows:

$$4 - 7 = -3$$



- The number line below shows:

$$-2 + 6 = 4$$



Roman Numerals

The seven main symbols

- I = 1
- = 5
- = 10
- = 50
- = 100
- = 500
- M = 1000



- V
- X
- L
- C
- D

Other useful ones include:

- IV = 4
- IX = 9
- XL = 40
- XC = 90

Written methods for addition

- Line up the digits in the correct columns
- Start from RIGHT to LEFT

e.g. $48 + 284 + 9$

	H	T	U
		4	8
	2	8	4
+	1	2	9
	3	4	1

Written methods for subtraction

- Line up the digits in the correct columns
- Start from RIGHT to LEFT

e.g. $645 - 427$

	H	T	U
	6	4	5
	4	2	7
-			
	2	1	8

Mental methods for addition

- Start from LEFT to RIGHT

Example 1 - think of:

$$45 + 32 \text{ as } 45 + 30 + 2$$

- But in your head say:
45 75 77

Example 2 - think of:

$$1236 + 415 \text{ as } 1236 + 400 + 10 + 5$$

- But in your head say:
1236 1636 1646 1651

Mental methods for subtraction

Example 1 - think of:

56 - 32 as **56** - 30 - 2

- But in your head say:

56 **26** **24**

Example 2 - think of:

1236 - **415** as **1236** - **400** - **10** - 5

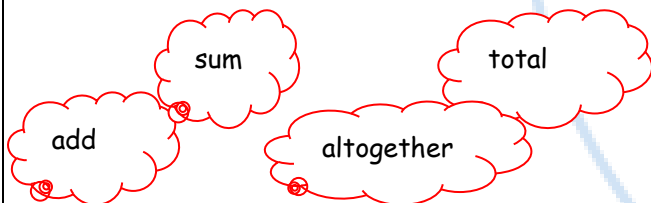
- But in your head say:

1236 **836** **826** **821**

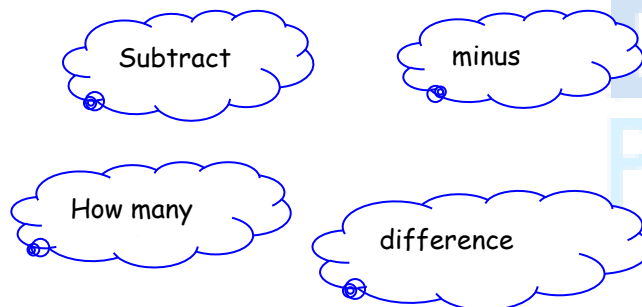
Multi-step problems

Based upon 5/6.

Words associated with addition:



Words associated with subtraction:



Multiples & factors

FACTORS are what divides exactly into a number

e.g. Factors of 12 are: Factors of 18 are:

1	12
2	6
3	4

1	18
2	9
3	6

The common factors of 12 & 18 are: 1, 2, 3, 6,

The Highest Common Factor is: 6

MULTIPLES are the times table answers

e.g. Multiples of 5 are: Multiples of 4 are:

5	10	15	20	25
---	----	----	-----------	----	------

4	8	12	16	20
---	---	----	----	-----------	-------

The Lowest Common Multiple of 5 and 4 is: **20**

Prime numbers

Prime numbers have only TWO factors

<p>The factors of 12 are: 1, 2, 3, 4, 6, 12</p> <p style="text-align: center;">↑</p> <p>12 is NOT prime It is composite</p>	<p>Factors of 7 are: 1, 7</p> <p style="text-align: center;">↑</p> <p>7 IS prime</p>
---	---

Prime numbers to 20

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

The number '1' is **NOT** prime

It has only ONE

Multiplication using a formal method

- By a **ONE-DIGIT** number

e.g. 3561 x 7

COLUMN METHOD

$$\begin{array}{r} 3561 \\ \times \quad 7 \\ \hline 24927 \\ \hline 34 \end{array}$$

e.g. 3561 x 7

GRID METHOD

	3000	500	60	7
7	21000	3500	420	49

21000 + 3500 + 420 + 49 = 24927

- By a **TWO-DIGIT** number

e.g. 152 x 34

COLUMN METHOD

$$\begin{array}{r} 152 \\ \times 34 \\ \hline 608 \quad (\times 4) \\ 4560 \quad (\times 30) \\ \hline 5168 \end{array}$$

e.g. 152 x 34

GRID METHOD

	100	50	2
30	3000	1500	60
4	400	200	8

152 x 34 = 3400 + 1700 + 68 = **5168**

Division using a formal method

- By a **ONE-DIGIT** number

e.g. $9138 \div 6$

$$\begin{array}{r} 1526 \\ 6 \overline{)9138} \end{array}$$

- By a **TWO-DIGIT** number

e.g. $4928 \div 32$ **SAME METHOD**
 (Except write down some of your tables down first)

$$\begin{array}{r} 0154 \\ 32 \overline{)49128} \end{array}$$

$4928 \div 32 = \underline{154}$

Multiply & divide by 10, 100, 1000

- By moving the decimal point

To **multiply** by 10 move the dp ONE place RIGHT

e.g. $13 \overset{\curvearrowright}{} \times 10 = 130$

$3.4 \overset{\curvearrowright}{} \times 10 = 34$

To **divide** by 10 move the dp ONE place LEFT

e.g. $13 \overset{\curvearrowleft}{} \div 10 = 1.3$

$3.4 \overset{\curvearrowleft}{} \div 10 = 0.34$

- By moving the digits

To multiply by 10 move the digits ONE place LEFT

e.g. 3.52×10

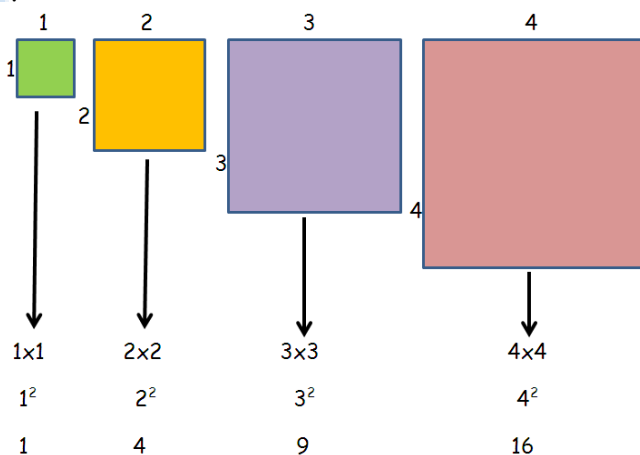
$$= 35.2$$

To multiply or divide by 100 move TWO places

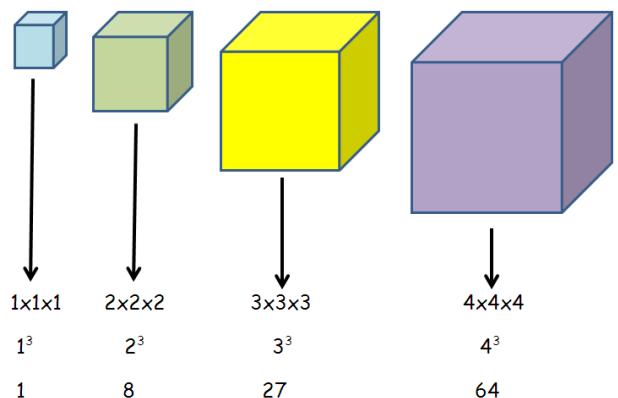
To multiply or divide by 1000 move THREE places

Square & Cube numbers

Square numbers

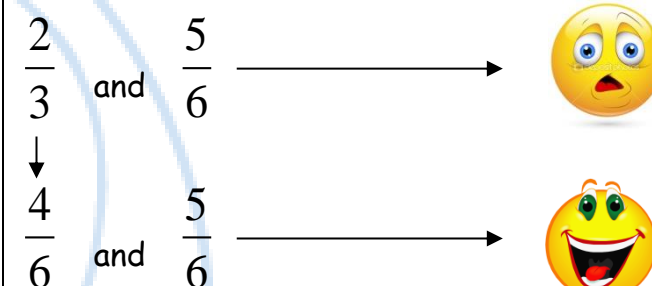


Cube numbers



Fractions

- To compare fractions - the denominators must be the same



SO $\frac{5}{6}$ is bigger than $\frac{2}{3}$

- To add and subtract fractions

When the denominators are the same

$\frac{5}{8} + \frac{1}{8} = \frac{6}{8}$

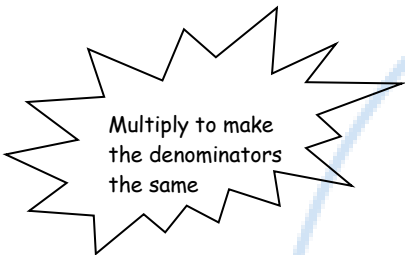
$\frac{5}{8} - \frac{1}{8} = \frac{4}{8}$

To add subtract fractions

When the denominators are different

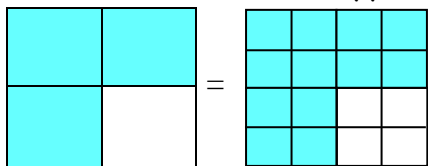
$$\frac{3}{8} + \frac{1}{4} \quad (\times 2)$$

$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$



Equivalent fractions

These fractions are the same but can be drawn and written in different ways



$$\frac{3}{4} = \frac{12}{16}$$

$$\frac{3}{4} \quad (\times 4) = \frac{12}{16} \quad (\times 4)$$

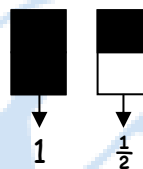
Fractions can also be divided to make the fraction look simpler - this is called **CANCELLING** or **LOWEST FORM**

$$\frac{12}{16} \quad (\div 4) = \frac{3}{4} \quad (\div 4)$$

Mixed & improper fractions

- An improper fraction is top heavy & can be changed into a mixed number

$\frac{3}{2}$ can be shown in a diagram



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

Improper fraction

Mixed number

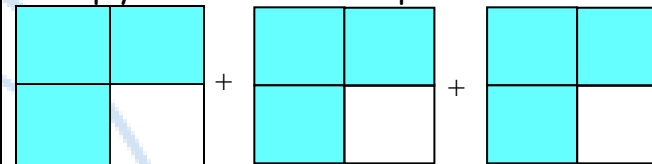
- A mixed number can be changed back into an improper fraction

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

$$2\frac{3}{4} = \frac{11}{4}$$

Multiply fractions

Multiply is the same as repeated addition



$$\frac{3}{4} + \frac{3}{4} + \frac{3}{4}$$

$$\frac{3}{4} \times 3 = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$$

OR

$$\frac{3}{4} \times \frac{3}{1} = \frac{9}{4} = 2\frac{1}{4}$$

Round decimals

Rules for rounding

1. Find the 'round off' digit
2. Move one digit to its right
3. Is this digit 5 or more

Yes - add one to the round off digit
 No - don't change the round off digit

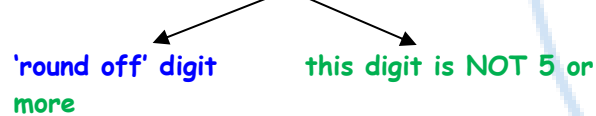
To the nearest whole number

e.g. 1 - To round 5.62 to the nearest whole



5.62 rounded to nearest whole = 6

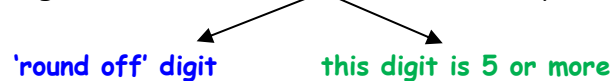
e.g. 2 - To round 5.32 to the nearest whole



5.32 rounded to nearest whole = 5

To one decimal place

e.g. 1 - To round 12.37 to 1 decimal place



12.37 rounded to 1dp = 12.4

e.g. 2 - To round 12.32 to the nearest whole



12.32 rounded to nearest whole = 12

Read & write decimals

The value of each digit is shown in the table

hundreds	tens	units	.	tenths	hundredths	thousandths
3	5	2	.	6	1	7
300	50	2		$\frac{6}{10}$	$\frac{1}{100}$	$\frac{7}{1000}$
352				$\frac{61}{100}$	$\frac{7}{1000}$	
352				$\frac{617}{1000}$		

Order decimals

Example - To order 0.28, 0.3, 0.216

- Write them under each other
- Fill gaps with zeros
- Then order them
-

0.28 → 0.280

0.3 → 0.300

0.216 → 0.216

smallest

largest

Order: 0.216 0.28 0.3

Decimal & Percentage equivalents

Learn

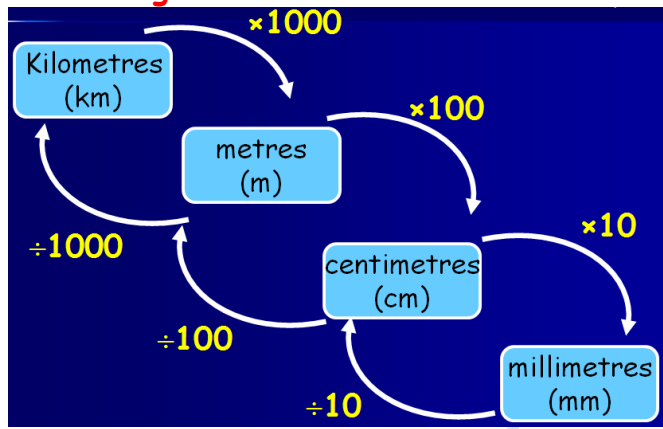
Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{1}{5}$	0.2	20%
$\frac{1}{10}$	0.1	10%
$\frac{1}{100}$	0.01	1%

Some fractions have to be changed to be 'out of 100'

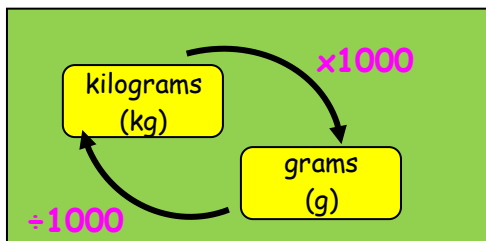
$$\frac{11}{25} \times \frac{4}{4} = \frac{44}{100} = 0.44 = 44\%$$

Convert metric measure

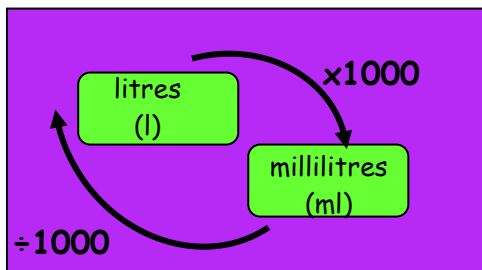
Length



Mass or weight

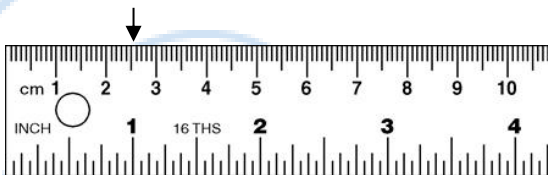


Capacity or volume



Imperial measure

1 inch is about 2.5cm



1km = 1.6 miles or 5miles = 8km

1kg is about 2.2pounds



A litres of water's a pint and three quarters

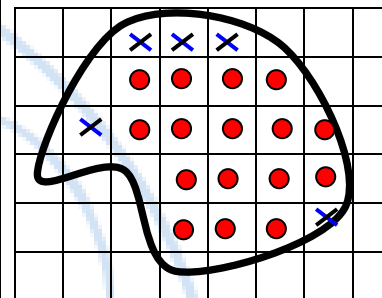


A gallon is about 4.5 litres



Area & Perimeter

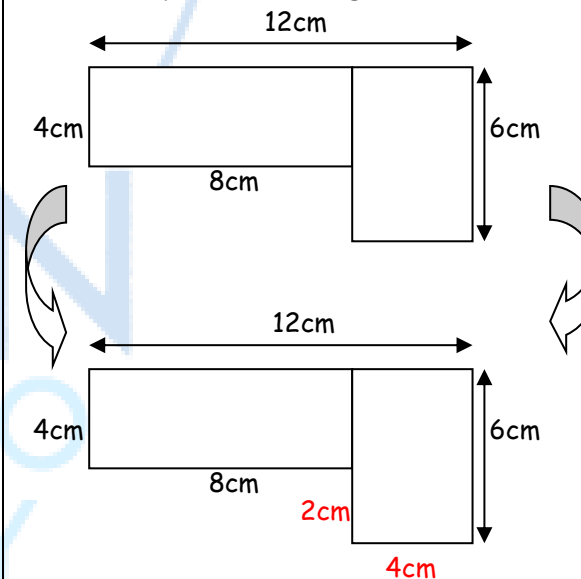
Estimate area



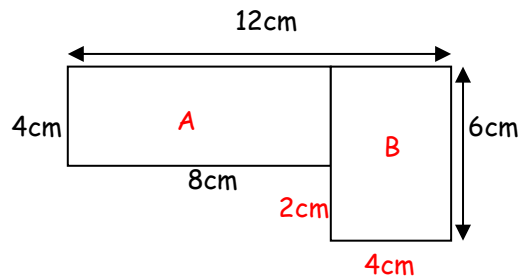
Number of whole squares (●) = 16
 Number of 1/2 or more (×) = 5
 Estimated area = 21 squares

Shapes composed of rectangles

Put on all missing lengths first
 For perimeter - ADD all lengths round outside
 For area - split into rectangles & add them together



Perimeter = $12 + 6 + 4 + 2 + 8 + 4 = 36\text{cm}$

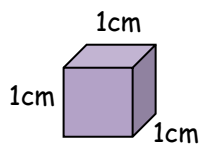


Area of shape = Area of A + B
 = $(8 \times 4) + (6 \times 4)$
 = $32 + 24$
 = 56cm^2

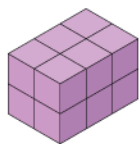
Volume

Volume is measured in cubes

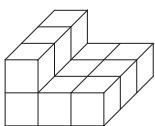
The 1 cm cube



The volume of this cube is 1 cm^3
 (1 cubic centimetre)
It holds 1ml of water

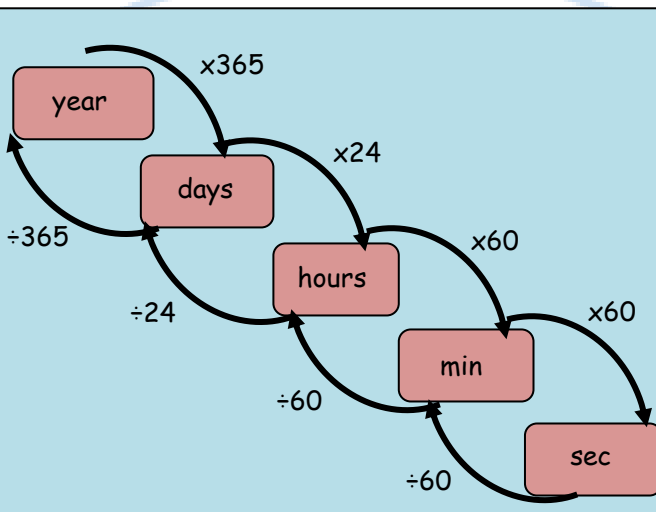


This cuboid contains 12 cubes
 So the volume is 12 cm^3



This 3D shape contains 12 cubes
 So the volume is 12 cm^3

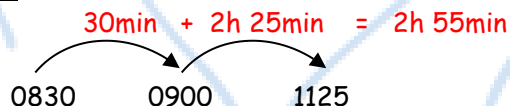
Units of time **Time conversion**



Time intervals

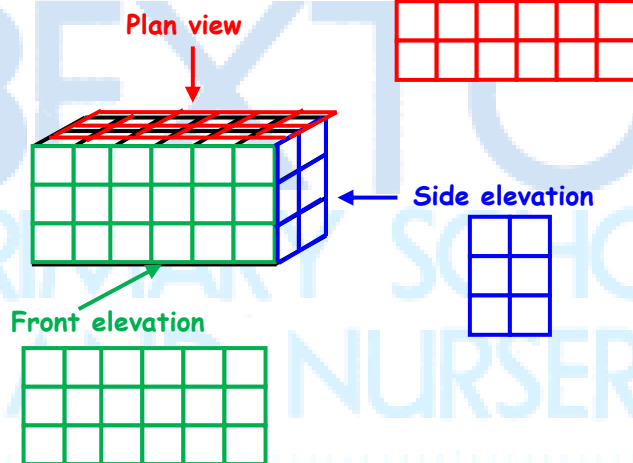
Always go to the next whole hour first

Example: 0830 to 1125



2D representations of 3D shapes

There are 3 views:



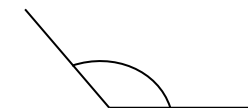
Angles

Types of angles

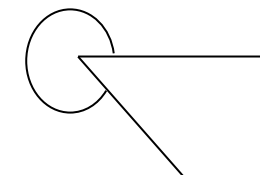
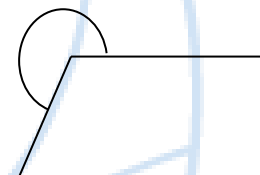
Acute
 (less than 90°)



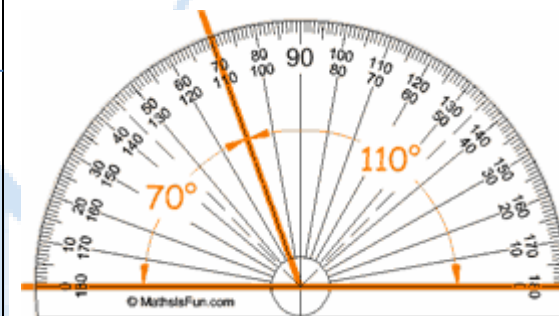
Obtuse
 (Between 90° & 180°)



Reflex
 (Between 180° & 360°)

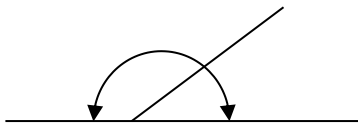


Measure and draw angles

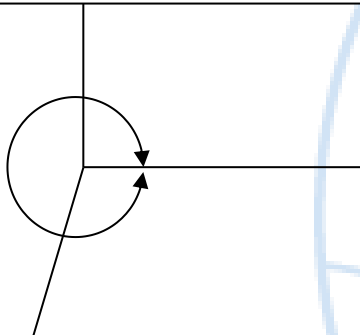


To be sure, count the number of degrees between the two arms of the angle

Angles



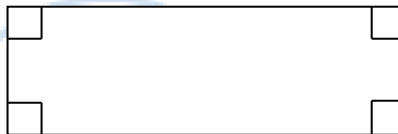
Angles on a straight line add up to 180°
or 2 right angles ($2 \times 90^\circ$)



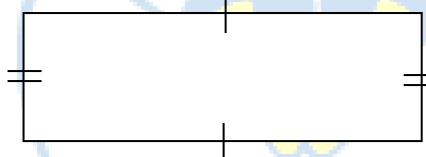
Angles about a point add up to 360°
or 4 right angles ($4 \times 90^\circ$)

Properties of the rectangle

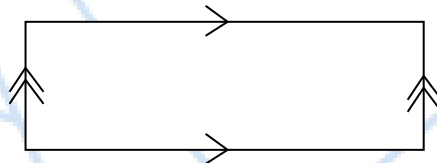
- A rectangle is a quadrilateral (4 sided shape)
- All angles are 90°



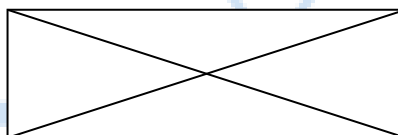
- Opposite sides are equal



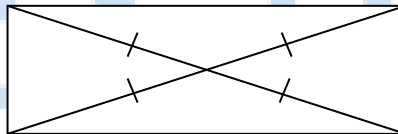
- Opposite sides are parallel



- Diagonals are equal



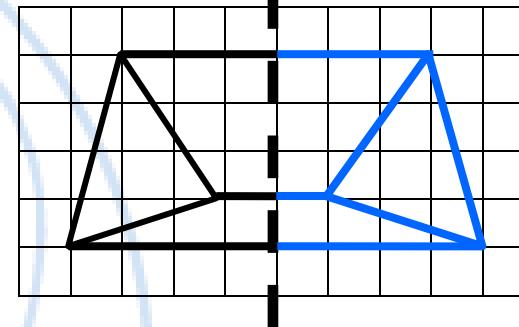
- Diagonals bisect each other (cut in half)



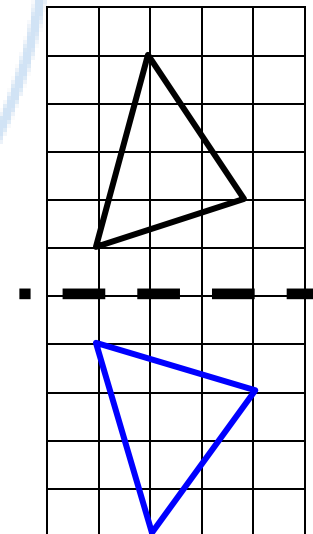
- A square is a special rectangle

Reflection

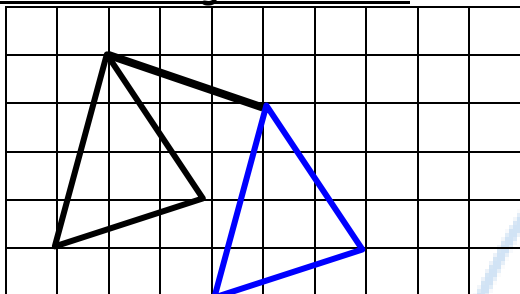
- Reflection in a vertical line



- Reflection in a horizontal line



Translation - 4 right & 1 down



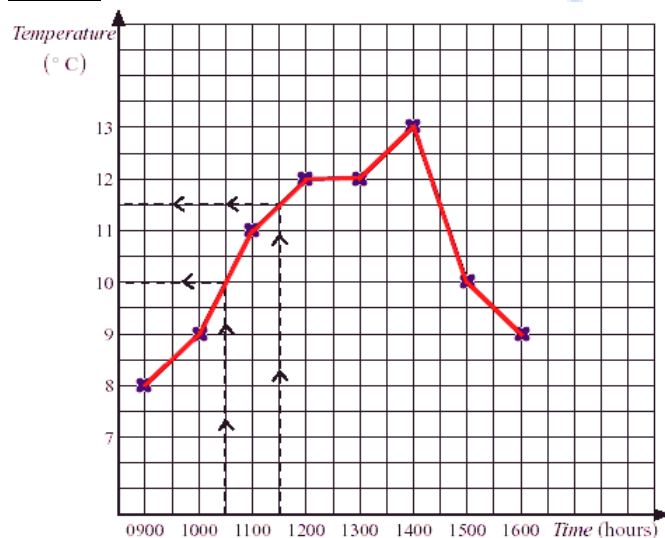
- In reflection and translation the shapes remain the same size and shape - CONGRUENT
- In reflection the shape is flipped over
- In translation the shape stays the same way up

Line graphs

- Find the difference

Example 1: What was the difference in temperature between 1030 and 1130?

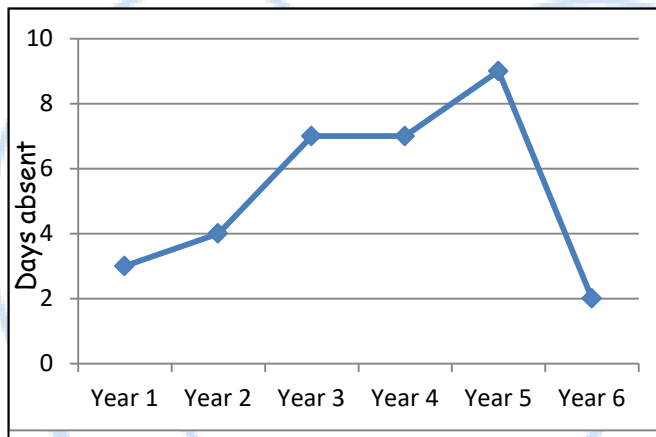
Answer: $11.5^{\circ}\text{C} - 10^{\circ}\text{C} = 1.5^{\circ}\text{C}$



- Find the sum of the data

Example: What was the total number of days absent over the 6 years?

Answer: $3 + 4 + 7 + 7 + 9 + 2 = 32$ days



Interpret information in tables

- Distance table

Example: Find the distance between **Leeds** and **York**

Answer: 40 miles

Hull				
100	Leeds			
162	73	Manchester		
110	60	65	Sheffield	
63	40	118	95	York

- Timetable

Example: How long is the film?

Answer: $1.10 - 2.35 = 1\text{h } 25\text{min} = 85\text{min}$

6.30am	Educational programme
7.00	Cartoons
7.25	News and weather
8.00	Wildlife programme
9.00	Children's programme
11.30	Music programme
12.30pm	Sports programme
1.00	News and weather
1.10 - 2.35pm	Film

- Table of results of goals scored

Example: Did boys or girls score the most goals?

Answer: Boys: $6+3+3+6=18$

Girls: $7+5=12$

Boys scored the most goals

	Game 1	Game 2	Game 3	Game 4	Game 5	Frequency
Peter	1	0	0	2	3	6
John	0	2	1	0	0	3
Ryan	1	0	1	1	0	3
Claire	2	0	2	1	2	7
Bill	3	1	1	0	1	6
Susan	0	1	3	1	0	5