

# Year 6 PROMPT sheet

## Place value in numbers to 10million

The position of the digit gives its size

Ten millions	Millions	Hundred thousands	Ten thousands	thousands	hundreds	tens	units
1	2	3	4	5	6	7	8

### Example

The value of the digit '1' is 10 000 000

The value of the digit '2' is 2 000 000

The value of the digit '3' is 300 000

The value of the digit '4' is 40 000

## Round whole numbers

**Example 1** - Round 342 679 to the nearest 10 000

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

4 or less? YES - leave 'round off digit' unchanged  
- Replace following digits with zeros

**ANSWER - 340 000**

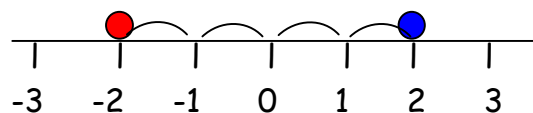
**Example 2** - Round 345 679 to the nearest 10 000

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

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

**ANSWER - 350 000**

## Negative numbers



$2 > -2$  → We say 2 is bigger than -2

$-2 < 2$  → We say -2 is less than 2

The difference between 2 and -2 = 4 (see line)

Remember the rules:

- When subtracting go down the number line
- When adding go up the number line
- $8 + -2$  is the same as  $8 - 2 = 6$
- $8 - +2$  is the same as  $8 - 2 = 6$
- $8 - -2$  is the same as  $8 + 2 = 10$

## Multiply numbers & estimate to check

e.g.  $152 \times 34$

### COLUMN METHOD

$$\begin{array}{r} 152 \\ 34x \\ \hline 608 \quad (x4) \\ 4560 \quad (x30) \\ \hline 5168 \end{array}$$

### Use estimates to check calculations

$$\begin{array}{l} 152 \times 34 \\ \approx 150 \times 30 \\ \approx 4500 \end{array}$$

≈ is the symbol for 'roughly equals'

## Divide numbers & estimate to check

With a remainder also expressed as a fraction

e.g.  $4928 \div 32$

### BUS SHELTER METHOD

$$\begin{array}{r} 028 \\ 15 \overline{) 432} \\ \underline{-30} \phantom{0} \\ 132 \\ \underline{-120} \\ 12 \end{array}$$

**ANSWER -  $432 \div 15 = 28 \text{ r } 12$**

$$= 28 \frac{12}{15}$$

## continued

With a remainder expressed as a decimal

$$\begin{array}{r} 028.8 \\ 15 \overline{)432.0} \\ \underline{-30} \phantom{0} \\ 132 \\ \underline{-120} \\ 12 \end{array}$$

$$15 \overline{)4^4 3^{13} 2.^{12} 0}$$

ANSWER -  $432 \div 15 = 28.8$

## 6/3 Use estimates to check calculations

$432 \div 15$

$\approx 450 \div 15$

$\approx 30$

## Factors, multiples & primes

- FACTORS** are what divides exactly into a number

e.g. Factors of 12 are:

1	12
2	6
3	4

Factors of 18 are:

1	18
2	9
3	6

The common factors of 12 & 18 are: 1, 2, 3, 6,  
The Highest Common Factor is: 6

- PRIME NUMBERS** have only TWO factors

e.g. Factors of 7 are:

1	7
---	---

Factors of 13 are:

1	13
---	----

So 7 and 13 are both prime numbers

- MULTIPLES** are the times table answers

e.g. Multiples of 5 are:

5 10 15 **20** 25 .....

Multiples of 4 are:

4 8 12 16 **20** .....

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

## Order of operations

**B**racket

**I**ndices

**D**ivide

**M**ultiply

**A**dd

**S**ubtract

} Do these in the order they appear

} Do these in the order they appear

$e.g. 3 + 4 \times 6 - 5 = 22$

$(2 + 1) \times 3 = 9$

↑ first  
↑ first

## Addition

- Line up the digits in the correct columns

$e.g. 48p + \pounds 2.84 + \pounds 9$

$0.48$

$2.84$

$9.00+$

$\pounds 12.32$

$111$

## Subtraction

- Line up the digits in the correct columns

$e.g. 645 - 427$

H T U

$6 \overset{3}{\cancel{4}} 15$

$427 -$

$218$

## Equivalent fractions

- To simplify a fraction

Example:  $\frac{27}{36}$

First find the highest common factor of the numerator and denominator - which is 9, then divide

$$\frac{27 \div 9}{36 \div 9} = \frac{3}{4}$$

- To change fractions to the same denominator

Example:  $\frac{3}{4}$  and  $\frac{2}{3}$

Find the highest common multiple of the denominators - which is 12, then multiply:

$$\frac{3^{x3}}{4^{x3}} = \frac{9}{12} \text{ and } \frac{2^{x4}}{3^{x4}} = \frac{8}{12}$$

## Add & subtract fractions

- Make the denominators the same

e.g. $\frac{1}{5} + \frac{7}{10}$ $= \frac{2}{10} + \frac{7}{10}$ $= \frac{9}{10}$	e.g. $\frac{4}{5} - \frac{2}{3}$ $= \frac{12}{15} - \frac{10}{15}$ $= \frac{2}{15}$
--	---

Do not add denominators

## Multiply fractions

- Write 5 as  $\frac{5}{1}$
- Multiply numerators & denominators

e.g. $5 \times \frac{2}{3}$ $= \frac{5}{1} \times \frac{2}{3}$ $= \frac{10}{3} = 3\frac{1}{3}$	e.g. $\frac{4}{5} \times \frac{2}{3}$ $= \frac{8}{15}$
--	---

## Divide fractions

- Write 5 as  $\frac{5}{1}$
- Invert the fraction after ÷ sign
- Multiply numerators & denominators

e.g. $\frac{2}{3} \div 5$ $= \frac{2}{3} \times \frac{1}{5}$ $= \frac{2}{15}$	e.g. $\frac{4}{5} \div \frac{2}{3}$ $= \frac{4}{5} \times \frac{3}{2}$ $= \frac{12}{10} = 1\frac{2}{10} = 1\frac{1}{5}$
---	---

## Multiply/divide decimals by 10, 100

thousands	hundreds	tens	units	•	tenths	hundredths	thousandths
4	3	5	2	•	6	1	7

- To multiply by 10**, move each digit one place to the left  
e.g.  $35.6 \times 10 = 356$

Hundreds	Tens	Units	•	tenths
	3	5	•	6
3	5	6	•	

- To divide by 10**, move each digit one place to the right

e.g.  $35.6 \div 10 = 3.56$

Tens	Units	•	tenths	hundredths
3	5	•	6	
	3	•	5	6

- To multiply by 100**, move each digit 2 places to the left
- To divide by 100**, move each digit 2 places to the right

## AN ALTERNATE METHOD

Instead of moving the digits  
Move the decimal point the opposite way

## Multiply decimals

- Step 1 - remove the decimal point
- Step 2 - multiply the two numbers
- Step 3 - Put the decimal back in

Example:  $0.06 \times 8$   
 $\Rightarrow 6 \times 8$   
 $\Rightarrow 48$   
 $\Rightarrow 0.48$

## Divide decimals

Use the bus shelter method  
 Keep the decimal point in the same place  
 Add zeros for remainders

Example:  $6.28 \div 5$

$$\begin{array}{r} 1.256 \\ 5 \overline{) 6.280} \end{array}$$

## Fraction, decimal, percentage equivalents

### LEARN THESE:

$$\frac{1}{4} = 0.25 = 25\%$$

$$\frac{1}{2} = 0.5 = 50\%$$

$$\frac{3}{4} = 0.75 = 75\%$$

$$\frac{1}{10} = 0.1 = 10\%$$

### Percentage to decimal to fraction

$$27\% = 0.27 = \frac{27}{100}$$

$$7\% = 0.07 = \frac{7}{100}$$

$$70\% = 0.7 = \frac{70}{100} = \frac{7}{10}$$

### Decimal to percentage to fraction

$$0.3 = 30\% = \frac{3}{10}$$

$$0.03 = 3\% = \frac{3}{100}$$

$$0.39 = 39\% = \frac{39}{100}$$

### Fraction to decimal to percentage

$$\frac{4}{5} = \frac{80}{100} = 80\% = 0.8$$

Change to 100

0.375

$$\frac{3}{8} = 3 \div 8 = 8) 3.0000 = 0.375 = 37.5\%$$

$$\frac{9}{12} = \frac{3}{4} = 0.75 = 75\%$$

Cancel by 3

## Fraction of quantity

- $\frac{4}{5}$  means  $\div 5 \times 4$

e.g. To find  $\frac{4}{5}$  of £40

$$\text{£}40 \div 5 \times 4 = \text{£}40$$

## Percentage of quantity

Use only

- 50% -  $\frac{1}{2}$
- 10% -  $\frac{1}{10}$
- 1% -  $\frac{1}{100}$

Example : To find 35% of £400

$$10\% = \text{£}40$$

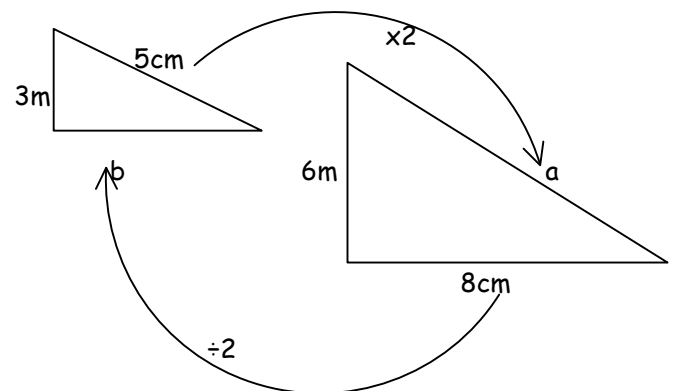
$$20\% = \text{£}80$$

$$5\% = \text{£}20$$

$$35\% = \text{£}140$$

## Similar shapes

When a shape is enlarged by a scale factor the two shapes are called SIMILAR shapes



$$\text{Scale factor} = 6 \div 3 = 2$$

$$\text{Length } a = 5 \times 2 = 10\text{cm}$$

$$\text{Length } b = 8 \div 2 = 4\text{cm}$$

## Unequal sharing

Example- unequal sharing of sweets

A gets

B gets

3 shares

4 shares

=> 3 sweets

4 sweets

=> 12 sweets

16 sweets

x4

x4

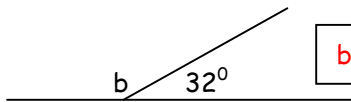
**Express missing numbers algebraically**

An unknown number is given a letter

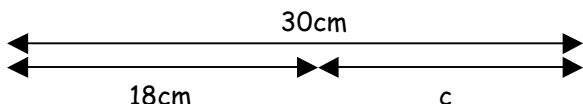
**Examples**

$2a - 4 = 8$

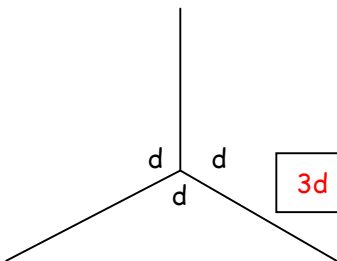
$2a = 12$  so  $a = 6$



$b + 32 = 180$  so  $b = 148^\circ$



$18 + c = 30$  so  $c = 12$



$3d = 360^\circ$  so  $d = 120^\circ$

**Use a word formula**

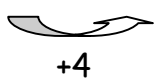
Example: - Time to cook a turkey  
Cook for 45min per kg weight  
Then a further 45min

For a 6kg turkey, follow the formula:  
 $45\text{min} \times 6 + 45\text{min}$   
 $= 270\text{min} + 45\text{min}$   
 $= 315\text{min}$   
 $= 5\text{h } 15\text{min}$

**Number sequences**

• Understand position and term

Position	1	2	3	4
Term	3	7	11	15



Term to term rule =  $+4$   
Position to term rule is  $\times 4 - 1$   
(because position  $1 \times 4 - 1 = 3$ )  
nth term =  $n \times 4 - 1 = 4n - 1$

• Generate terms of a sequence

If the nth term is  $5n + 1$   
1<sup>st</sup> term ( $n=1$ ) =  $5 \times 1 + 1 = 6$   
2<sup>nd</sup> term ( $n=2$ ) =  $5 \times 2 + 1 = 11$   
3<sup>rd</sup> term ( $n=3$ ) =  $5 \times 3 + 1 = 16$

**Possible solutions of a number sentence**

Example: x and y are numbers  
Rule:  $x + y = 5$   
Possible solutions:  $x = 0$  and  $y = 5$   
 $x = 1$  and  $y = 4$   
 $x = 2$  and  $y = 3$   
 $x = 3$  and  $y = 2$   
 $x = 4$  and  $y = 1$   
 $x = 5$  and  $y = 0$

**Convert units of measure**

**METRIC**

When converting measurements follow these rules:  
• When converting from a larger unit to a smaller unit we multiply (x)  
• When converting from a smaller unit to a larger unit we divide (÷)

UNITS of LENGTH  
 $10\text{mm} = 1\text{cm}$   
 $100\text{cm} = 1\text{m}$   
 $1000\text{m} = 1\text{km}$

UNITS of MASS  
 $1000\text{g} = 1\text{kg}$   
 $1000\text{kg} = 1\text{tonne}$

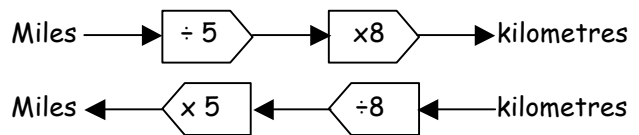
UNITS of VOLUME  
 $1000\text{ml} = 1\text{litre}$   
 $100\text{cl} = 1\text{litre}$

UNITS of TIME  
 $60\text{sec} = 1\text{min}$   
 $60\text{min} = 1\text{hour}$   
 $24\text{h} = 1\text{day}$   
 $365\text{days} = 1\text{year}$

**Convert units of measure**

**METRIC/IMPERIAL**

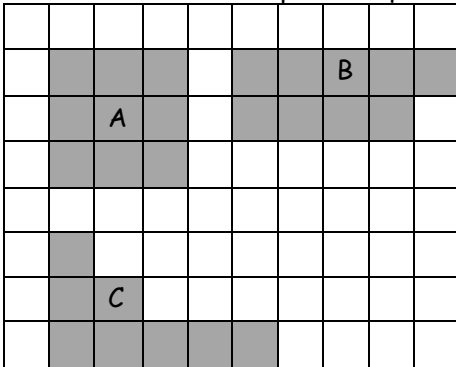
LEARN: 5 miles = 8km



## Perimeter and area of shapes

Shapes can have the SAME area but different perimeters

The area of each shape is 9 squares



Perimeter of each shape is different  
A - 12; B - 14; C - 16

## Area of parallelogram & triangle

Area of parallelogram =  $b \times h$   
 $= 8 \times 5$   
 $= 40\text{cm}^2$

Area of triangle ( $\frac{1}{2}$  a parallelogram)  
 Area of triangle =  $\frac{b \times h}{2}$   
 $= \frac{8 \times 5}{2}$   
 $= 20\text{cm}^2$

## Volume

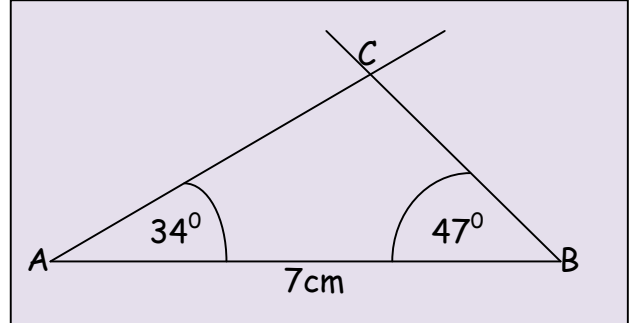
Volume of cuboid  
 Volume =  $l \times w \times h$   
 $= 5 \times 3 \times 2$   
 $= 30\text{cm}^3$

Volume of cube  
 Volume =  $l \times w \times h$   
 $= 3 \times 3 \times 3$   
 $= 27\text{m}^3$

## Construct 2D shapes

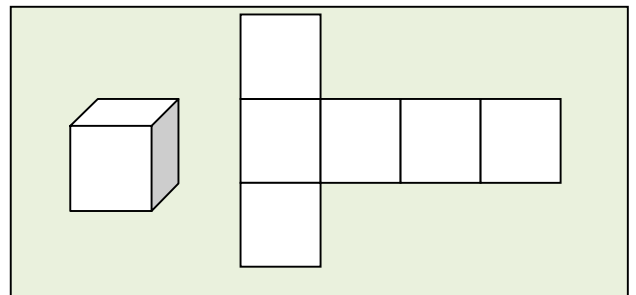
Example : Triangle with side and angles given

- Draw line  $AB = 7\text{cm}$
- Draw angle  $34^\circ$  at point A from line AB
- Draw angle  $47^\circ$  at point B from line AB
- Extend to intersect the lines at C

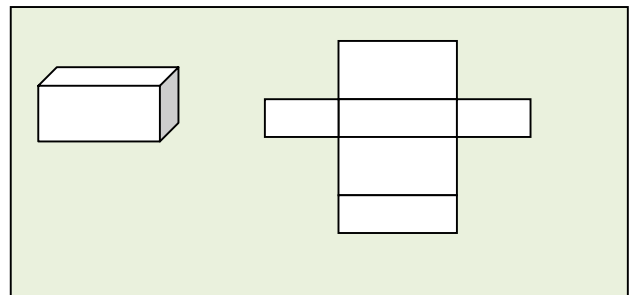


## Construct 3D shapes

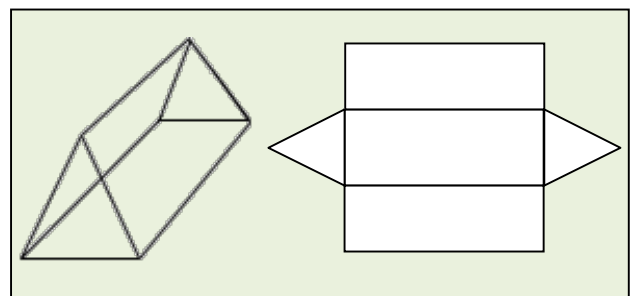
CUBE & its net



CUBOID & its net



TRIANGULAR PRISM & its net

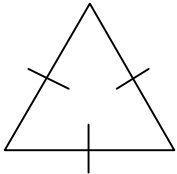


**Properties of shapes**

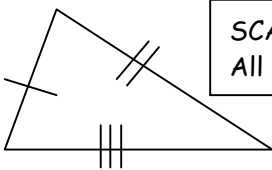
**TRIANGLES - sum of angles = 180°**



ISOSCELES triangle  
2 equal sides & 2 equal angles

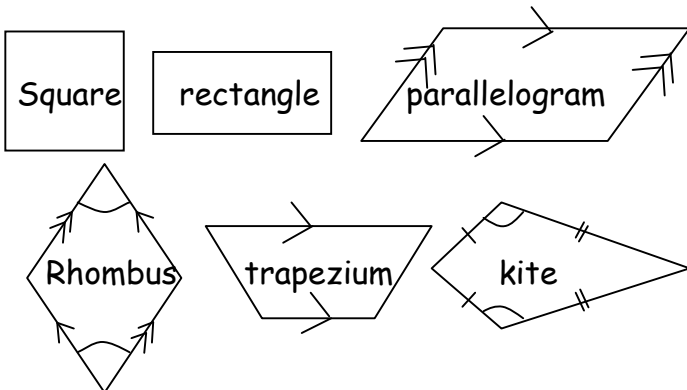


EQUILATERAL triangle  
3 equal sides & ALL angles 60°



SCALENE triangle  
All sides & angles different

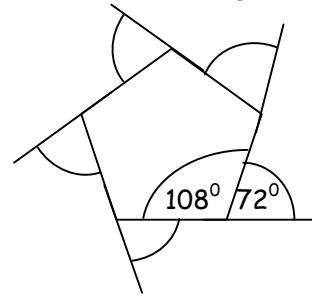
**QUADRILATERALS - sum of angles = 360°**



**REGULAR POLYGONS - all sides the same**

- Polygons have straight sides
- Polygons are named by the number sides
  - 3 sides - triangle
  - 4 sides - quadrilateral
  - 5 sides - pentagon
  - 6 sides - hexagon
  - 7 sides - heptagon
  - 8 sides - octagon
  - 9 sides - nonagon
  - 10 sides - decagon

- Sum of exterior angles is always 360°



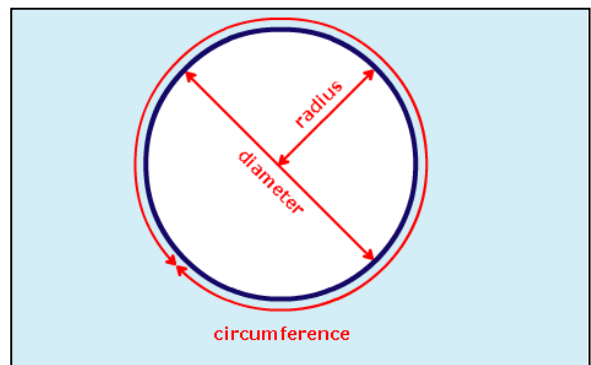
- interior & exterior angle add up to 180°

- the interior angles add up to:

Triangle = 1 x 180° = 180°  
 Quadrilateral = 2 x 180° = 360°  
 Pentagon = 3 x 180° = 540°  
 Hexagon = 4 x 180° = 720° etc

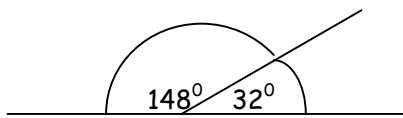
**Parts of a circle**

- The circumference is the distance all the way around a circle.
- The diameter is the distance right across the middle of the circle, passing through the centre.
- The radius is the distance halfway across the circle.
- The radius is always half the length of the diameter. (d = 2 x r) or (r = 1/2 x d)



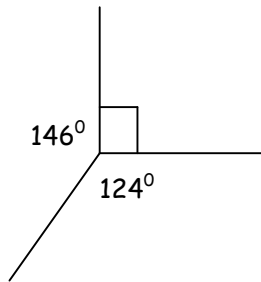
## Angles and straight lines

- Angles on a straight line add up to  $180^\circ$



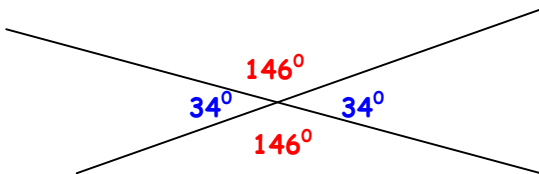
$$148^\circ + 32^\circ = 180^\circ$$

- Angles about a point add up to  $360^\circ$

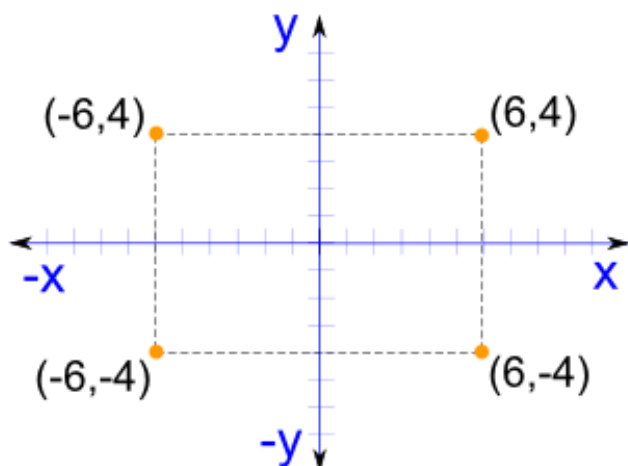


$$146^\circ + 90^\circ + 124^\circ = 360^\circ$$

- Vertically opposite angles are equal

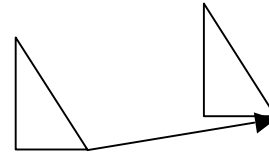


## Position on a co-ordinate grid



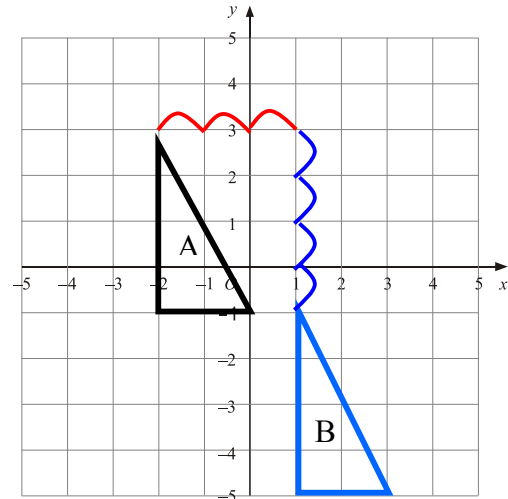
## Transformations

- Translation** - A shape moved along a line



Example - Move shape A 3 right & 4 down

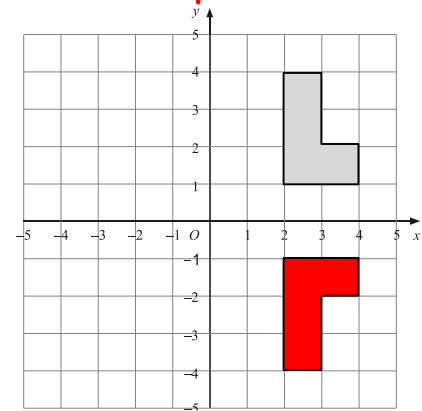
Can also be written as a vector  $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$  Right Down



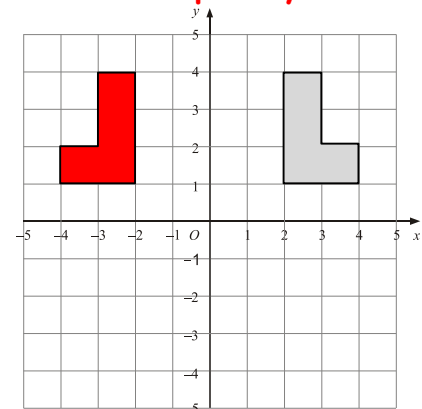
Notice:

- The new shape stays the same way up
- The new shape is the same size

- Reflect a shape in x-axis**



- Reflect a shape in y-axis**





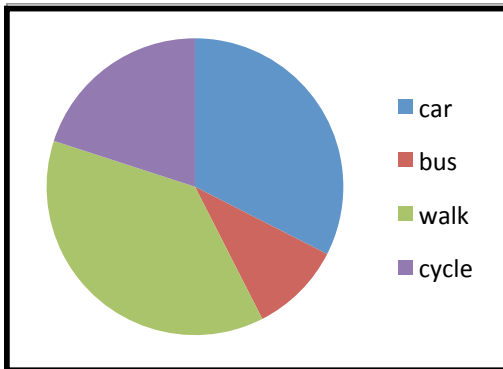
## Graphs

### ○ Pie chart

Transport	Frequency	Angle
Car	13	$13 \times 9 = 117^\circ$
Bus	4	$4 \times 9 = 36^\circ$
Walk	15	$15 \times 9 = 135^\circ$
Cycle	8	$8 \times 9 = 72^\circ$

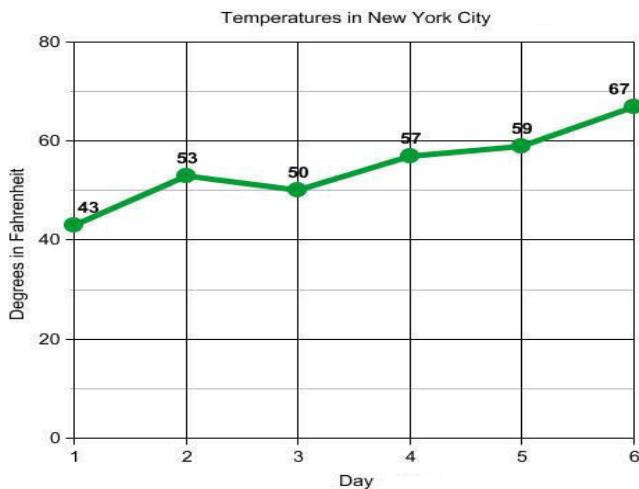
↑  
Total frequency = 40

$360^\circ \div 40 = 9^\circ$  per person



### ○ Line graph

Line graphs show changes in a single variable - in this graph changes in temperature can be observed.



## The mean

The mean is usually known as the average.

The mean is not a value from the original list.

It is a typical value of a set of data

**Mean = total of measures  $\div$  no. of measures**

e.g.- Find mean speed of 6 cars travelling on a road

Car 1 - 66mph

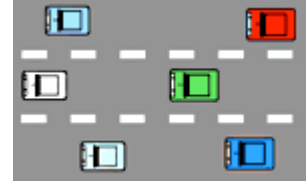
Car 2 - 57mph

Car 3 - 71mph

Car 4 - 54mph

Car 5 - 69mph

Car 6 - 58mph



Mean =  $\frac{66+57+71+54+69+58}{6}$

6

=  $\frac{375}{6}$

6

= 62.5mph

Mean average speed was 62.5mph