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

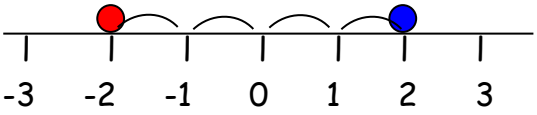
Example 2- Round 345 679 to the nearest 10 000

- 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 x 34

COLUMN METHOD

152
34x
608 (x4)
4560 (x30)
5168

Use estimates to check calculations

152 x 34
≈150 x 30
≈4500

≈ is the symbol for 'roughly equals'

Subtraction

- Line up the digits in the correct columns

e.g. 645 - 427

H T U
6 ³4 ¹5
4 2 7 -
2 1 8

Divide numbers & estimate to check

With a remainder also expressed as a fraction

e.g. 4928 ÷ 32 **BUS SHELTER METHOD**

```
   0 2 8                0 2  8  r 12
15)4 3 2             15)4⁴3¹³2
 -3 0 ↓
   1 3 2
  -1 2 0
     1 2
```

ANSWER - 432 ÷ 15 = **28 r 12**

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

With a remainder expressed as a decimal

```
   0 2 8 . 8            0 2  8 . 8
15)4 3 2 . 0         15)4⁴3¹³2 .¹²0
 -3 0 ↓
   1 3 2
  -1 2 0
     1 2
```

ANSWER - 432 ÷ 15 = **28 . 8**

6/3 Use estimates to check calculations

432 ÷ 15
≈ 450 ÷ 15
≈ 30

Order of operations

Bracket
Indices
Divide
Multiply } Do these in the order they appear
Add
Subtract } Do these in the order they appear

e.g. 3 + 4 x 6 - 5 = 22
first

(2 + 1) x 3 = 9
First

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**

Addition

- **Line up the digits in the correct columns**

e.g. 48p + £2.84 + £9

```
  0 . 4 8
  2 . 8 4
  9 . 0 0+
£1 2 . 3 2
  1 1   1
```

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:
45min x 6 + 45min
=270min + 45min
=315min
= 5h 15min

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

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
10mm = 1cm
100cm = 1m
1000m = 1km

UNITS of MASS
1000g = 1kg
1000kg = 1tonne

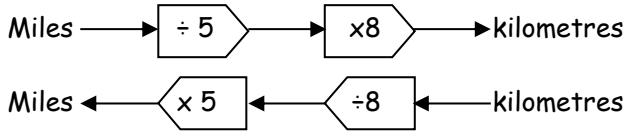
UNITS of VOLUME
1000ml = 1 litre
100cl = 1litre

UNITS of TIME
60sec = 1 min
60min = 1 hour
24h = 1 day
365days = 1 year

Convert units of measure

METRIC/IMPERIAL

LEARN: 5 miles = 8km



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 x 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 ÷ 10 = 356= 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
- **To multiply by 1000,** move each digit 3 places to the left
- **To divide by 1000,** move each digit 3 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 x 8
=> 6 x 8
=> 48
=> 0.48

Divide decimals

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

Example: 6.28 ÷ 5

$$5\overline{)\,6.^{1}2^{2}8^{3}0} \quad 1.256$$

Fraction of quantity

- $\frac{4}{5}$ means ÷ 5 x 4

e.g. To find $\frac{4}{5}$ of £40

£40 ÷ 5 x 4 = £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% = £40
20% = £80
5% = £20
35% = £140

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

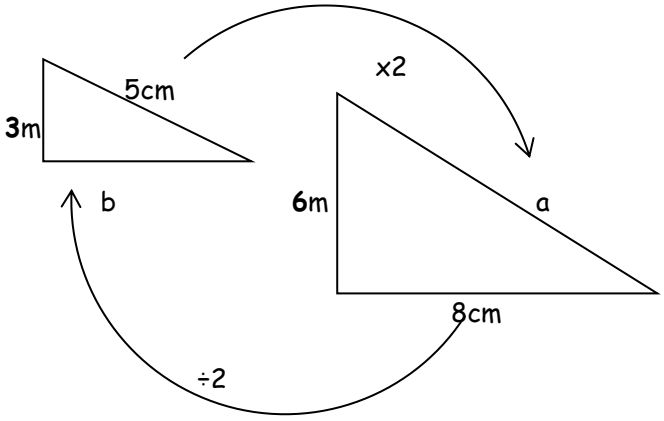
$\frac{3}{8}$ = 3 ÷ 8 = $8\overline{)3.^{3}0^{6}0^{4}0}$ = 0.375 = 37.5%

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

Cancel by 3

Similar shapes

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



Scale factor = known matching sides 6 ÷ 3 = 2
Length a = 5 x 2 = 10cm
Length b = 8 ÷ 2 = 4cm

Unequal sharing

Example- unequal sharing of sweets

A gets	B gets
3 shares	4 shares
=> 3 sweets	4 sweets
=> 12 sweets (x4)	16 sweets (x4)

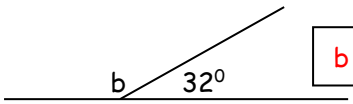
Express missing numbers algebraically

An unknown number is given a letter

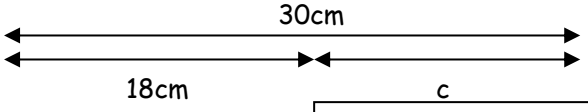
Examples

2a – 4 = 8

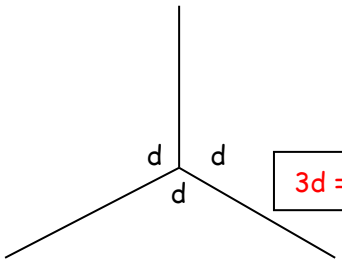
2a = 12 so a = 6



b + 32 = 180 so b = 148⁰



18 + c = 30 so c = 12



3d = 360⁰ so d = 120⁰

Number sequences

- **Understand position and term**

Position	1	2	3	4
Term	3	7	11	15

+4

Term to term rule = +4
Position to term rule is x 4 - 1
(because position 1 x 4 – 1 = 3)
nth term = n x 4 -1 = 4n – 1

- **Generate terms of a sequence**

If the nth term is 5n + 1
1st term *(n=1)* = 5x1 + 1 = 6
2nd term *(n=2)* = 5x2 + 1= 11
3rd term *(n=3)* = 5x3 + 1 = 16

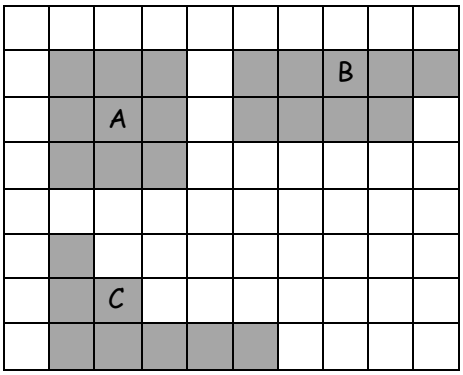
Possible solutions of a number sentence

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

Perimeter and area of shapes

Shapes can have the SAME area but different perimeters

The area of each shape is 9 squares

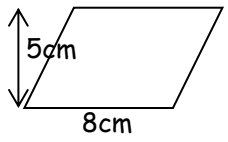


Perimeter of each shape is different
A – 12;
B – 14;
C -16

Area of parallelogram & triangle

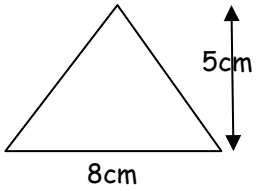
- **Area of parallelogram**

Area of parallelogram = b x h
= 8 x 5
= 40cm²



- **Area of triangle (½ a parallelogram)**

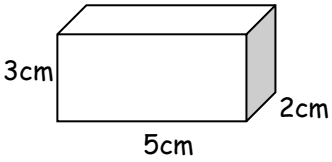
Area of triangle = $\frac{b \times h}{2}$
= $\frac{8 \times 5}{2}$
20cm²



Volume

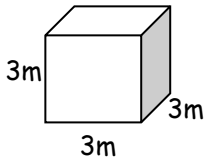
- **Volume of cuboid**

Volume = l x w x h
= 5 x 3 x 2
= 30cm³



- **Volume of cube**

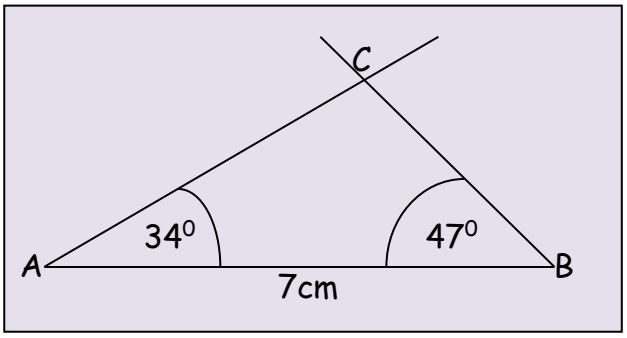
Volume = l x w x h
= 3 x 3 x 3
= 27m³



Construct 2D shapes

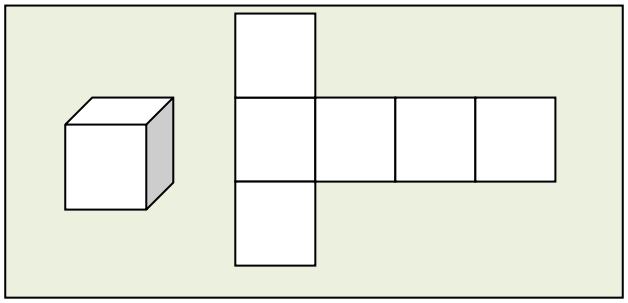
Example :
Triangle with side and angles given

- Draw line AB = 7cm
- Draw angle 34⁰ at point A from line AB
- Draw angle 47⁰ at point B from line AB
- Extend to intersect the lines at C

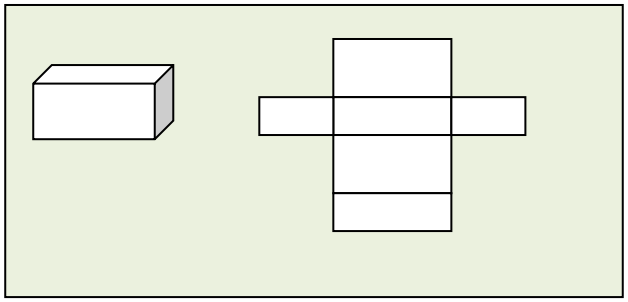


Construct 3D shapes

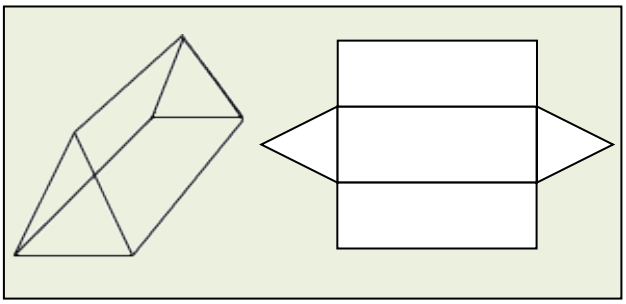
CUBE & its net



CUBOID & its net



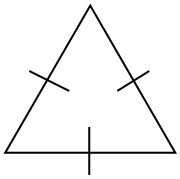
TRIANGULAR PRISM & its net



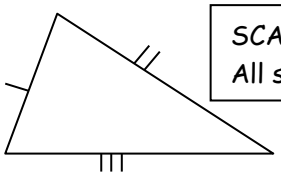
Properties of shapes

TRIANGLES – sum of angles = 180^0

ISOSCELES triangle
2 equal sides & 2 equal angles

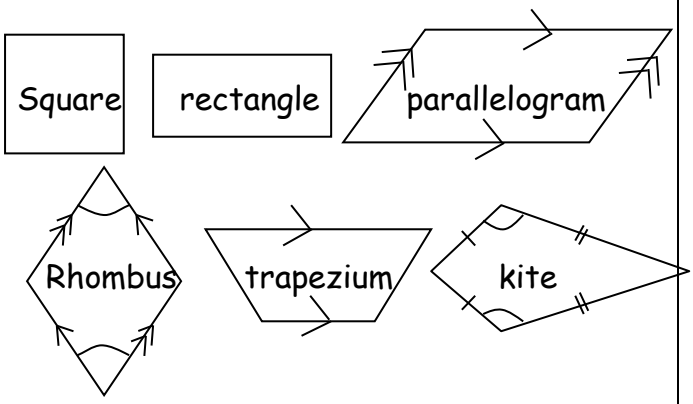


EQUILATERAL triangle
3 equal sides & ALL angles 60^0



SCALENE triangle
All sides & angles different

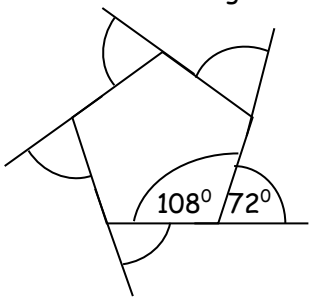
QUADRILATERALS – sum of angles = 360^0



REGULAR POLGONS – 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 360^0

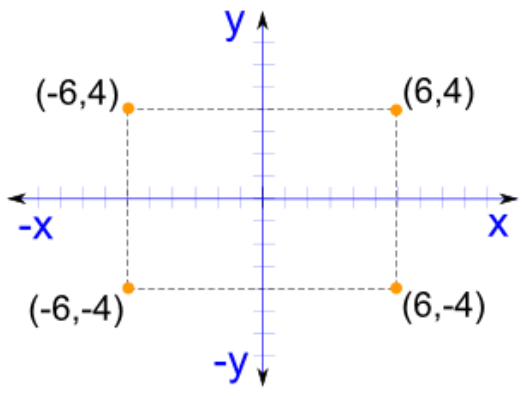


- interior & exterior angle add up to 180^0

The interior angles add up to:

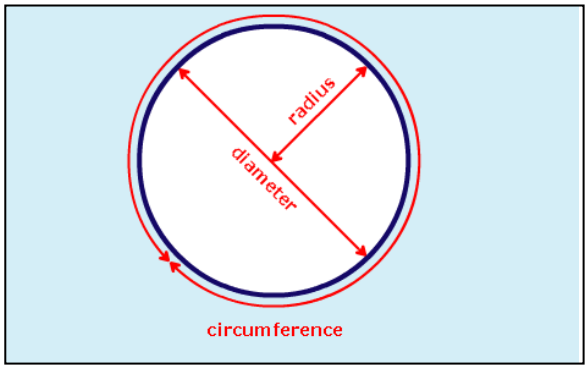
Triangle $=1 \times 180^0 = 180^0$
Quadrilateral $=2 \times 180^0 = 360^0$
Pentagon $=3 \times 180^0 = 540^0$
Hexagon $=4 \times 180^0 = 720^0$ etc

Position on a co-ordinate grid



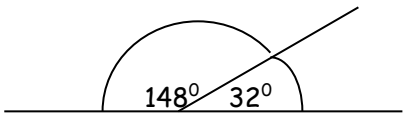
Parts of a circle

- 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 = $\frac{1}{2}$ x d)



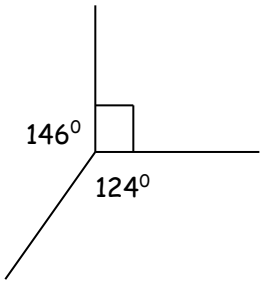
Angles and straight lines

- Angles on a straight line add up to 180^0



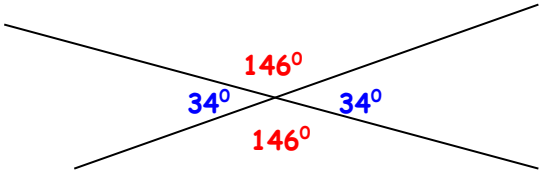
$148^0 + 32^0 = 180^0$

- Angles about a point add up to 360^0



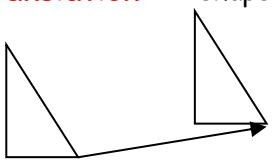
$146^0 + 90^0 + 124^0 = 360^0$

- Vertically opposite angles are equal



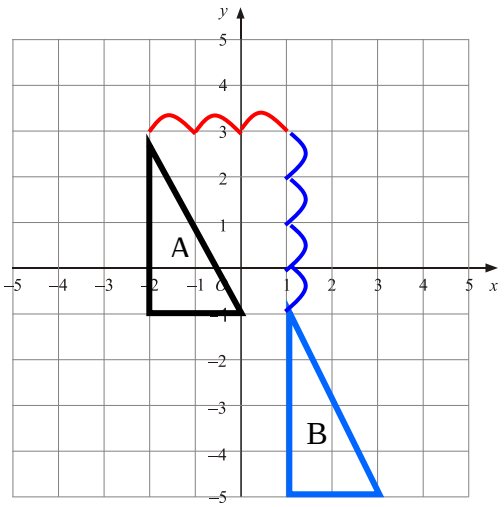
Transformations

- **Translation** – A shape moved along a line



Example – Move shape A 3 right & 4 down

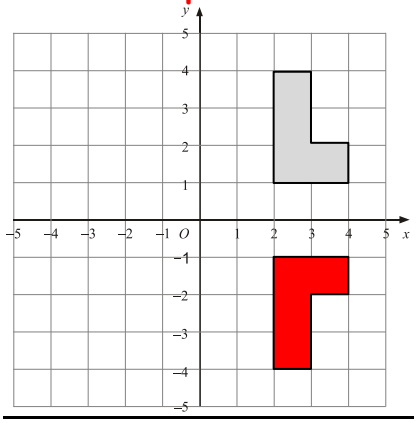
Can also be written as a vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ Right / Down



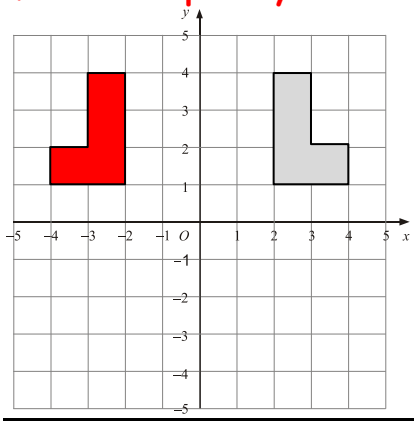
Notice:

- 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**



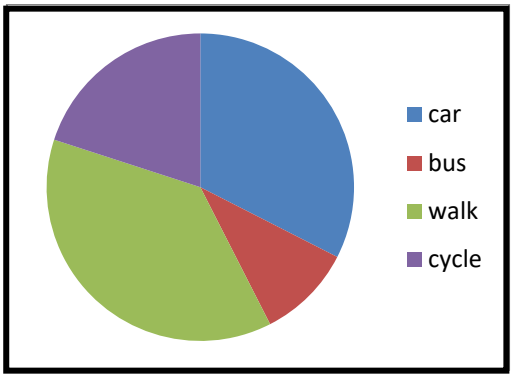
Graphs

○ Pie chart

Transport	Frequency	Angle
Car	13	13 x 9=117^0
Bus	4	4 x 9=36^0
Walk	15	15 x 9=135
Cycle	8	8 x 9=72

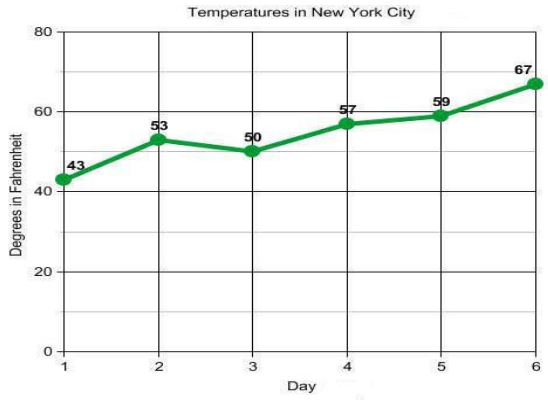
Total frequency = 40

360^0 ÷ 40 = 9^0 per person

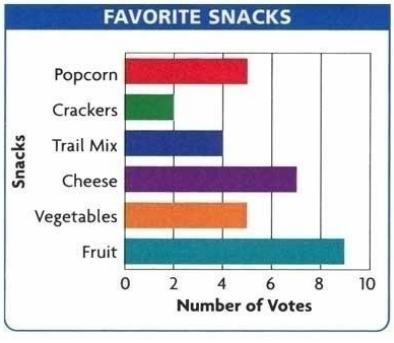


○ Line graph

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



• Bar graph



• Pictogram

Colour	Number of Smarties	Frequency
Green		7
Orange		8
Blue		5
Pink		6
Yellow		11
Red		8
Purple		7
Brown		3
	Key = 2 smarties	

• Carroll diagram

	Has curved lines	Has straight lines
Has more than three sides		
Has three sides or fewer than three sides		

• Venn diagram

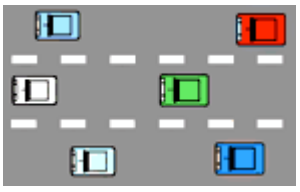
The mean

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 ÷ 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 = $\frac{66+57+71+54+69+58}{6}$

= $\frac{375}{6}$

= 62.5mph

Mean average speed was 62.5mph