Stage 6 PROMPT sheet

6/1 Place value in numbers to 10million

The position of the digit gives its size

Ten millions	Millions	Hundred	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   **3**00 000
The value of the digit '**4**' is   **4**0 000

6/1 Round whole numbers

Example 1– Round 3**42** 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
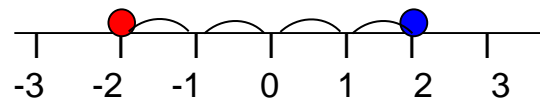   - Replace following digits with zeros

ANSWER – 3**4**0 000

Example 2– Round 3**45** 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 – 3**5**0 000

6/2 Negative numbers

$2 > -2 \longrightarrow$ We say 2 is bigger than -2

$-2 < 2 \longrightarrow$ 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

6/3 Multiply numbers & estimate to check

e.g. 152 x 34   **COLUMN METHOD**

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

6/3 Use estimates to check calculations

152 x 34
≈150 x 30
≈4500

≈ is the symbol for 'roughly equals'

6/3 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**

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

6/3 continued
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

6/4 Factors, multiples & primes

- **FACTORS** are what divides exactly into a number

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

```
  1   12            1   18
  2   6             2   9
  3   4             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: Factors of 13 are

```
  1   7             1   13
```

So 7 and 13 are both prime numbers

- **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**

6/5 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

6/6 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
```

- - - - - - - - - - - - - - - - - - - -

6/6 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
```

6/7 Equivalent fractions

- To simplify a fraction

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

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

$$\dfrac{27}{36} \begin{array}{l} ^{\div 9} \\ _{\div 9} \end{array} = \dfrac{3}{4}$$

- To change fractions to the same denominator

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

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

$$\dfrac{3}{4}\begin{array}{l}^{x3}\\_{x3}\end{array} = \dfrac{9}{12} \text{ and } \dfrac{2}{3}\begin{array}{l}^{x4}\\_{x4}\end{array} = \dfrac{8}{12}$$

6/8 Add & subtract fractions

o Make the denominators the same

e.g. $\dfrac{1}{5} + \dfrac{7}{10}$

$= \dfrac{2}{10} + \dfrac{7}{10}$

$= \dfrac{9}{10}$

e.g. $\dfrac{4}{5} - \dfrac{2}{3}$

$= \dfrac{12}{15} - \dfrac{10}{15}$

$= \dfrac{2}{15}$

> Do not add denominators

6/9 Multiply fractions

o Write 5 as $\dfrac{5}{1}$

o Multiply numerators & denominators

e.g. $5 \times \dfrac{2}{3}$

$= \dfrac{5}{1} \times \dfrac{2}{3}$

$= \dfrac{10}{3} = 3\dfrac{1}{3}$

e.g. $\dfrac{4}{5} \times \dfrac{2}{3}$

$= \dfrac{8}{15}$

6/9 Divide fractions

o Write 5 as $\dfrac{5}{1}$

o Invert the fraction after ÷ sign

o Multiply numerators & denominators

e.g. $\dfrac{2}{3} \div 5$

$= \dfrac{3}{2} \times \dfrac{1}{5}$

$= \dfrac{3}{10}$

e.g. $\dfrac{4}{5} \div \dfrac{2}{3}$

$= \dfrac{4}{5} \times \dfrac{3}{2}$

$= \dfrac{12}{10} = 1\dfrac{2}{10} = 1\dfrac{1}{5}$

6/10 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

AN ALTERNATE METHOD
Instead of moving the digits
Move the decimal point the opposite way

6/11 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

6/11 Divide decimals
Use the bus shelter method
Keep the decimal point in the same place
Add zeros for remainders

Example: 6.28 ÷ 5

$$5\ )\ \overline{6\ .\ {}^12{}^28{}^30}$$
  1 . 2 5 6

6/12 <u>Fraction, decimal, percentage equivalents</u>

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

$$\frac{3}{8} = 3 \div 8 = \begin{array}{r} 0.\,3\,7\,5 \\ 8)\overline{3.{}^30{}^60{}^40} \end{array} = 0.375 = 37.5\%$$

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

Cancel by 3

6/13 <u>Fraction of quantity</u>

- $\frac{4}{5}$ means ÷ 5 x 4

e.g. To find $\frac{4}{5}$ of £40

£40 ÷ 5 x 4 = £40

6/13 <u>Percentage of quantity</u>

<u>Use only</u>

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

<u>Example</u> : To find 35% of £400
10% = £40
20% = £80
 5% = £20
35% = £140

6/14 <u>Similar shapes</u>

When a shape is enlarged by a scale factor the two shapes are called SIMILAR shapes
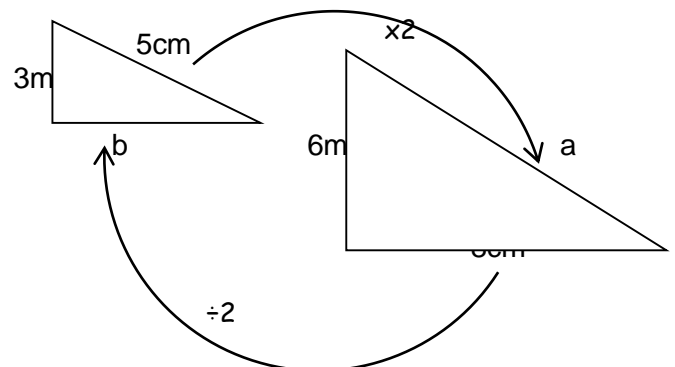
Scale factor = 6 ÷ 3 = 2
Length a = 5 x 2 = 10cm
Length b = 8 ÷ 2 = 4cm

6/14 <u>Unequal sharing</u>
Example- unequal sharing of sweets

A gets	B gets
3 shares	4 shares
=> 3 sweets	4 sweets
=> 12 sweets ×4	16 sweets ×4

6/15 Express missing numbers algebraically

An unknown number is given a letter

Examples

$2a - 4 = 8$

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

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

b 32^0

30cm

18cm

c

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

d d

d
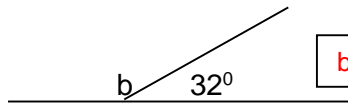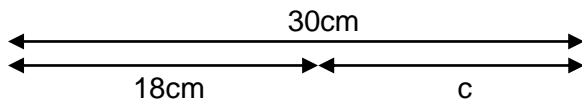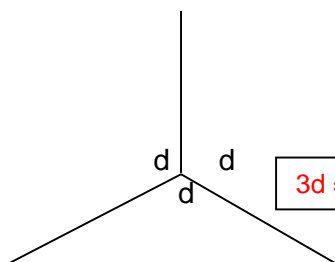
$3d = 360^0$ so $d = 120^0$

6/15 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

6/16 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

6/17 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

6/18 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 TIME
60sec = 1 min
60min = 1 hour
24h   = 1 day
365days = 1 year

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

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

6/19 Convert units of measure
METRIC/IMPERIAL

LEARN: 5 miles = 8km

Miles ──→ ÷ 5 ──→ x8 ──→ kilometres

Miles ←── x 5 ←── ÷8 ←── kilometres
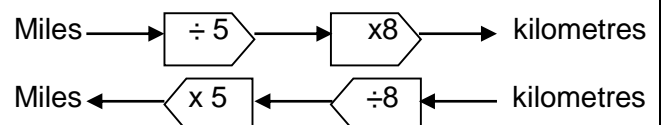
6/20 Perimeter and area of shapes

Shapes can have the SAME area but different perimeters

The area of each shape is 9 squares
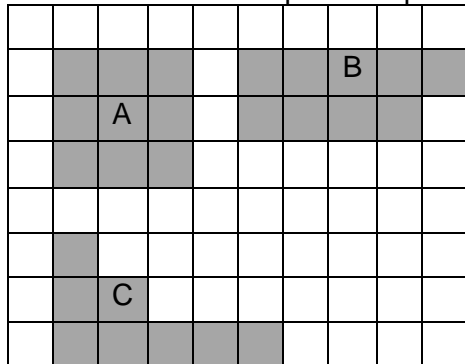
Perimeter of each shape is different
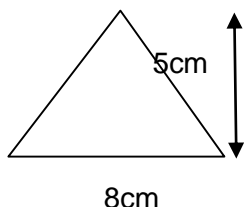A – 12; B – 14; C -16

6/21 Area of parallelogram & triangle

- o **Area of parallelogram**

Area of parallelogram = b x h
= 8 x 5
= $40cm^2$

5cm
8cm
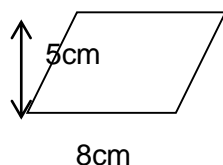
- o **Area of triangle (½ a parallelogram)**

Area of triangle = $\dfrac{b \times h}{2}$

= $\dfrac{8 \times 5}{2}$

$20cm^2$

5cm
8cm

6/22 Volume

- o **Volume of cuboid**

Volume = l x w x h
= 5 x 3 x 2
= $30cm^3$

3cm
5cm
2cm

- o **Volume of cube**

Volume = l x w x h
= 3 x 3 x 3
= $27m^3$

3m
3m
3m
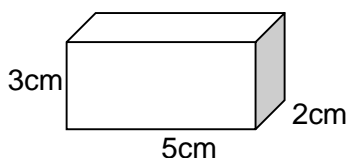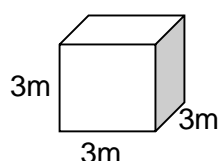
6/23 Construct 2D shapes

Example : Triangle with side and angles given
- o Draw line AB = 7cm
- o Draw angle 34^0 at point A from line AB
- o Draw angle 47^0 at point B from line AB
- o Extend to intersect the lines at C

C
34^0
47^0
A
B
7cm
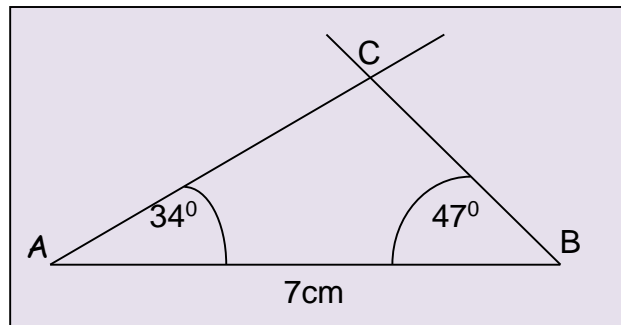
6/23 Construct 3D shapes

CUBE & its net
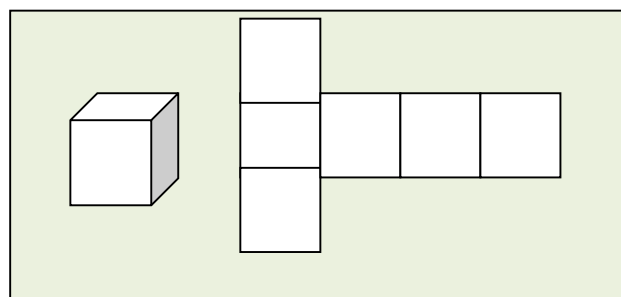
CUBOID & its net
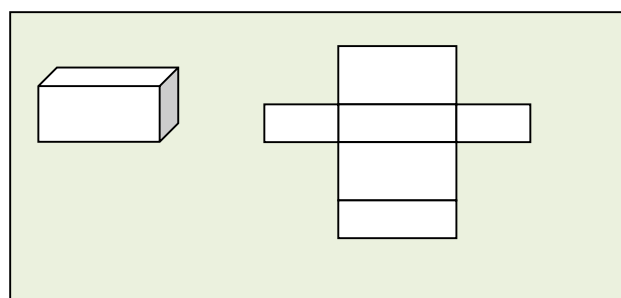
TRIANGULAR PRISM & its net
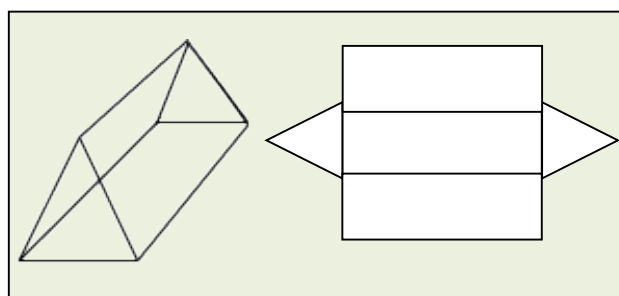
6/24 Properties of shapes

TRIANGLES – sum of angles = 180^0
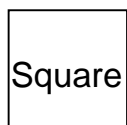
ISOSCELES triangle
2 equal sides & 2 equal angles
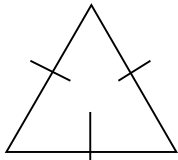
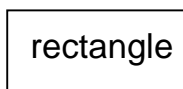EQUILATERAL triangle
3 equal sides & ALL angles 60^0
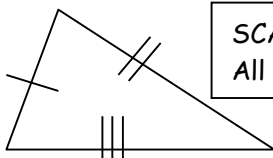
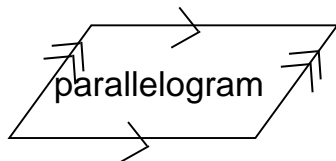SCALENE triangle
All sides & angles different

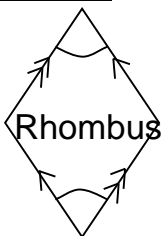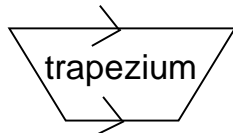QUADRILATERALS – sum of angles = 360^0

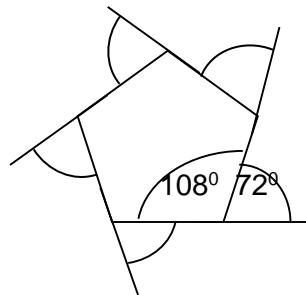Square | rectangle | parallelogram

Rhombus | trapezium | kite

REGULAR POLGONS – all sides the same
- o Polygons have straight sides
- o 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

- o Sum of exterior angles is always 360^0
- o

108^0 72^0

- o interior & exterior angle add up to 180^0

- o the interior angles add up to:

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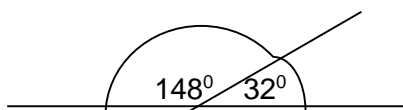Hexagon   =4 x 180^0 = 720^0 etc

6/25 Parts of a circle
- o The circumference is the distance all the way around a circle.
- o The diameter is the distance right across the middle of the circle, passing through the centre.
- o The radius is the distance halfway across the circle.
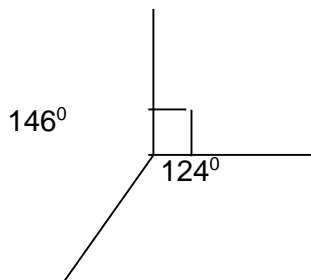- o The radius is always half the length of the diameter. (d = 2 x r) or (r = ½ x d)

radius
diameter

circumference
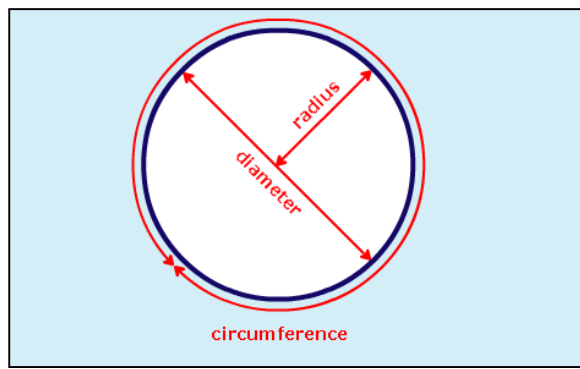
6/26 Angles and straight lines

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

148^0 32^0

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

- Angles about a point add up to 360^0

146^0

124^0

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

- Vertically opposite angles are equal

146^0

34^0   **34^0**

146^0
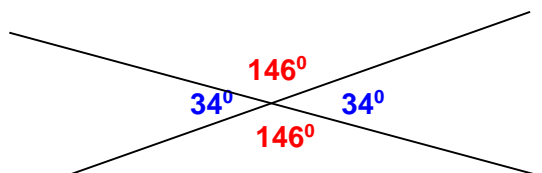
6/27 Position on a co-ordinate grid

(-6,4)   (6,4)
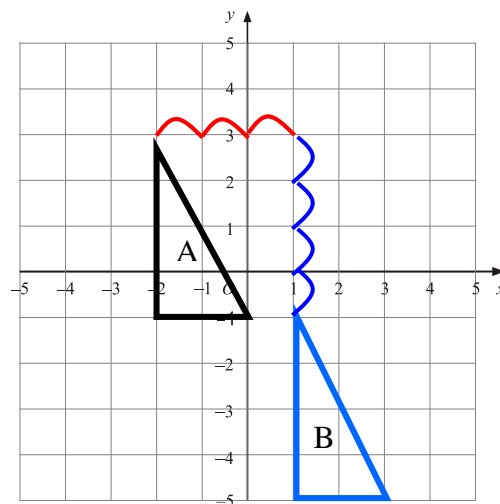
-x   x

(-6,-4)   (6,-4)
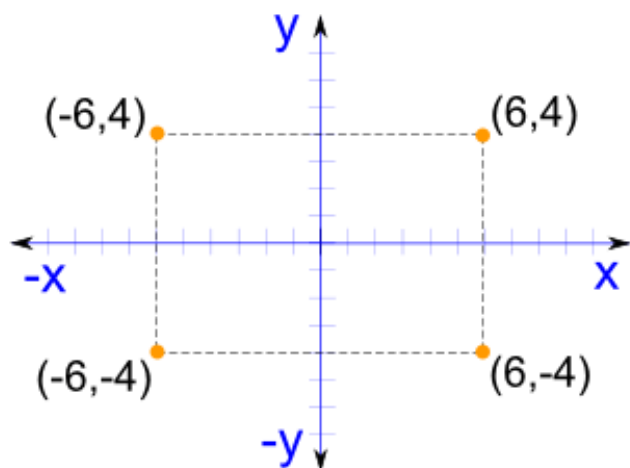
6/28 Transformations

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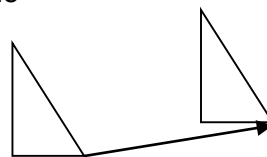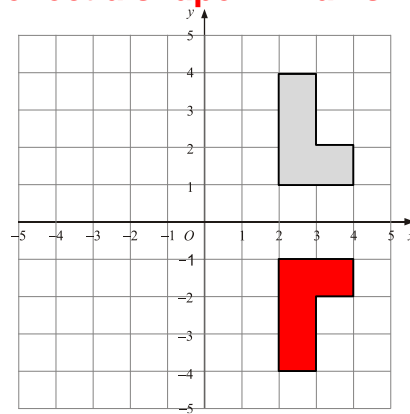

Example – Move shape A 3 right & 4 down
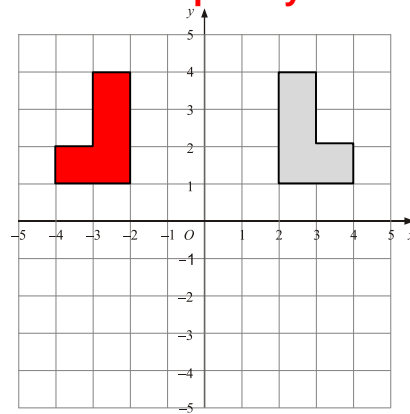Can also be written as a vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ Right Down

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

- **Reflect a shape in x-axis**
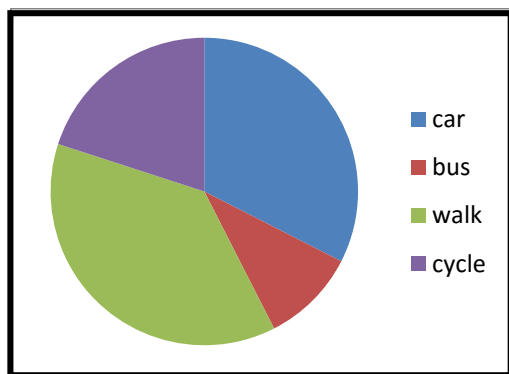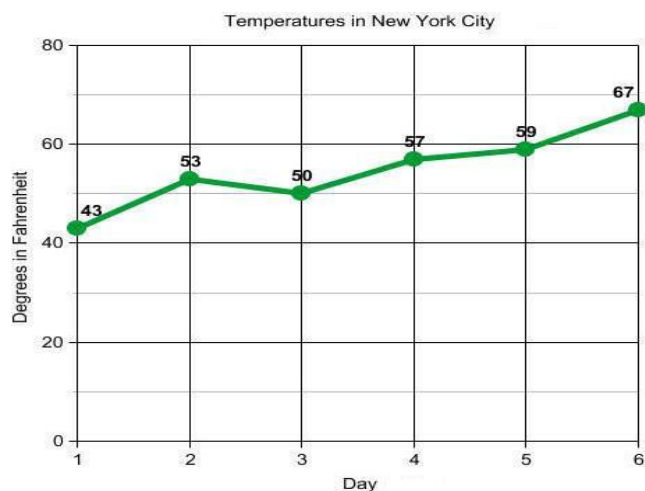

- **Reflect a shape in y-axis**

6/29 Graphs

- ### Pie chart

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

Total frequency = 40
$360^0 \div 40 = 9^0$ per person

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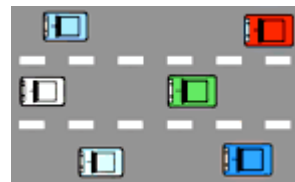

6/30 The mean
The mean is usually known as the average.
The mean is not a value from the original list.
It is a typical value of a set of data

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