

# Stage 6 PROMPT sheet

## 1 Place value in numbers to 10million

The position of the digit gives its size

Ten millions	Millions	Hundred thousands	Ten thousands	thousands	hundreds	tens	ones
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

## 1 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**

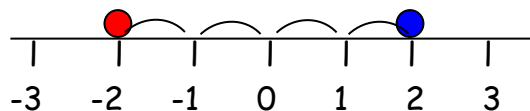
**Example 2-** Round 345 679 to the nearest 10 000

- 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**

## 2 Negative numbers



$2 > -2$  → We say 2 is greater 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  $8 + 2 = 10$

## 3 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'

### 3 Divide numbers & estimate to check

#### With a remainder also expressed as a fraction

Write out the tables: 15, 30, 45, 60, 75, 90, 105, 120

e.g.  $432 \div 15$  **BUS SHELTER METHOD**

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

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

#### With a remainder expressed as a decimal

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

ANSWER -  $432 \div 15 = 28.8$

#### Use estimates to check calculations

$432 \div 15$   
 $\approx 450 \div 15$   
 $\approx 30$

### 4 Factors, multiples & primes

♦ **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

♦ **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

A **prime factor** is a factor that is a prime number so factors of 15 are 1, 3, 5, 15. The prime factors are 3 and 5.

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

### 5 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

### 6 Addition

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

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

$$\begin{array}{r} 0.48 \\ 2.84 \\ 9.00+ \\ \hline \pounds 12.32 \\ 1 \quad 1 \end{array}$$

## 6 Subtraction

- Line up the digits in the correct columns

e.g.  $645 - 427$

H	T	U	
6	<del>4</del>	5	
4	2	7	-
2	1	8	

## 7 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:

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

So  $\frac{2}{3}$  is smaller than  $\frac{3}{4}$

You can use this skill to then order fractions.

## 8 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

## 9 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.  $\frac{4}{5} \times \frac{2}{3}$

$$= \frac{8}{15}$$

## 9 Divide fractions

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

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

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

$$= \frac{2}{15}$$

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

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

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

## 10 Multiply/divide decimals by 10, 100

thousands	hundreds	tens	ones	•	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	Ones	•	tenths
	3	5	•	6
3	5	6	•	

## Multiply/divide decimals by 10, 100 cont.

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

e.g.  $35.6 \div 10 = 356 = 3.56$

Tens	Ones	•	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

## 11 Multiply decimals

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

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

## 11 Divide decimals

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

Example:  $6.28 \div 5$

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

## 12 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

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

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

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

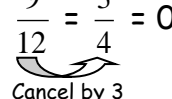
### ♦ Fraction to decimal to percentage

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

  
Change to 100

$$\frac{3}{8} = 3 \div 8 = 8) \overline{3.000} = 0.375 = 37.5\%$$

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

  
Cancel by 3

### 13 Fraction of quantity

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

e.g. To find  $\frac{4}{5}$  of £40

$$£40 \div 5 \times 4 = £40$$

### 13 Percentage of quantity

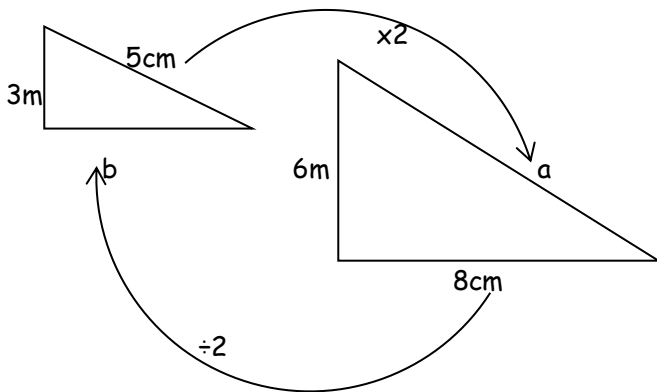
Use only

- 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

### 14 Similar shapes

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



Scale factor =  $6 \div 3 = 2$   
 Length a =  $5 \times 2 = 10\text{cm}$   
 Length b =  $8 \div 2 = 4\text{cm}$

### 14 Unequal sharing

Example- unequal sharing of sweets 3:4

A gets 3 shares      B gets 4 shares  
 $\Rightarrow 3$  sweets  $\times 4$        $\Rightarrow 4$  sweets  $\times 4$   
 $\Rightarrow 12$  sweets       $\Rightarrow 16$  sweets

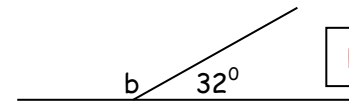
### 15 Express missing numbers algebraically

An unknown number is given a letter

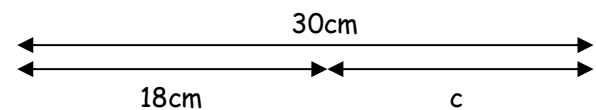
#### Examples

$$2a - 4 = 8$$

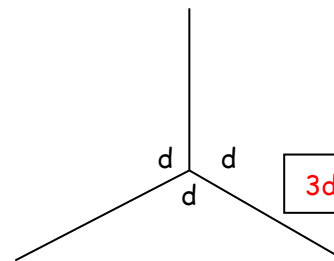
$$2a = 12 \text{ so } a = 6$$



$$b + 32 = 180 \text{ so } b = 148^\circ$$



$$18 + c = 30 \text{ so } c = 12$$



$$3d = 360^\circ \text{ so } d = 120^\circ$$

### 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:  
 $45\text{min} \times 6 + 45\text{min}$   
 $= 270\text{min} + 45\text{min}$   
 $= 315\text{min}$   
 $= \underline{5\text{h } 15\text{min}}$

### 16 Number sequences

♦ Understand position and term

Position	1	2	3	4
Term	3	7	11	15

$\xrightarrow{+4}$

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

## Number sequences contin..

### ♦ Generate terms of a sequence

If the nth term is  $5n + 1$

$$1^{\text{st}} \text{ term } (n=1) = 5 \times 1 + 1 = 6$$

$$2^{\text{nd}} \text{ term } (n=2) = 5 \times 2 + 1 = 11$$

$$3^{\text{rd}} \text{ term } (n=3) = 5 \times 3 + 1 = 16$$

## 17 Possible solutions of a number sentence

Example: x and y are numbers

$$\text{Rule: } x + y = 5$$

Possible solutions: x = 0 and y = 5

$$x = 1 \text{ and } y = 4$$

$$x = 2 \text{ and } y = 3$$

$$x = 3 \text{ and } y = 2$$

$$x = 4 \text{ and } y = 1$$

$$x = 5 \text{ and } y = 0$$

## 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

$$10\text{mm} = 1\text{cm}$$

$$100\text{cm} = 1\text{m}$$

$$1000\text{m} = 1\text{km}$$

#### 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

$$60\text{sec} = 1 \text{ min}$$

$$60\text{min} = 1 \text{ hour}$$

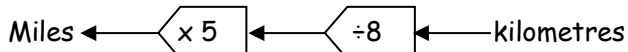
$$24\text{h} = 1 \text{ day}$$

$$365\text{days} = 1 \text{ year}$$

## 19 Convert units of measure

### METRIC/IMPERIAL

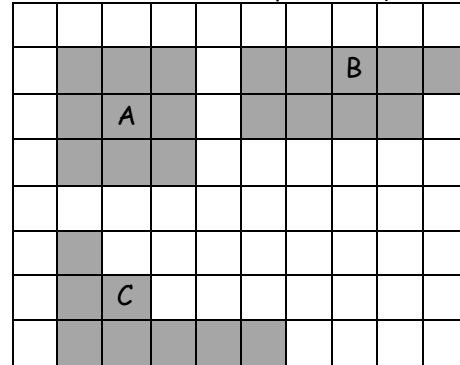
LEARN: 5 miles = 8km



## 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

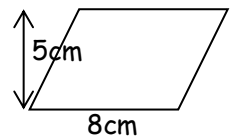
## 21 Area of parallelogram & triangle

### ○ Area of parallelogram

$$\text{Area of parallelogram} = b \times h$$

$$= 8 \times 5$$

$$= \underline{40\text{cm}^2}$$

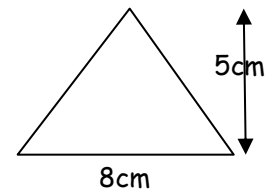


### ○ Area of triangle ( $\frac{1}{2}$ a parallelogram)

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

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

$$= \underline{20\text{cm}^2}$$



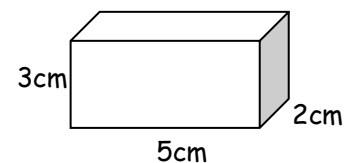
## 22 Volume

### ○ Volume of cuboid

$$\text{Volume} = l \times w \times h$$

$$= 5 \times 3 \times 2$$

$$= \underline{30\text{cm}^3}$$

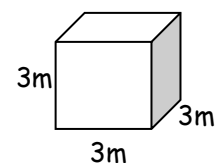


### ○ Volume of cube

$$\text{Volume} = l \times w \times h$$

$$= 3 \times 3 \times 3$$

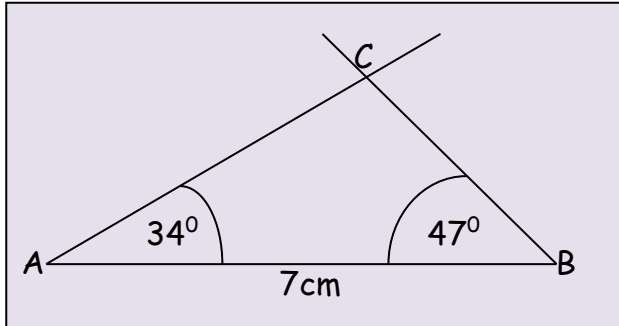
$$= \underline{27\text{m}^3}$$



## 23 Construct 2D shapes

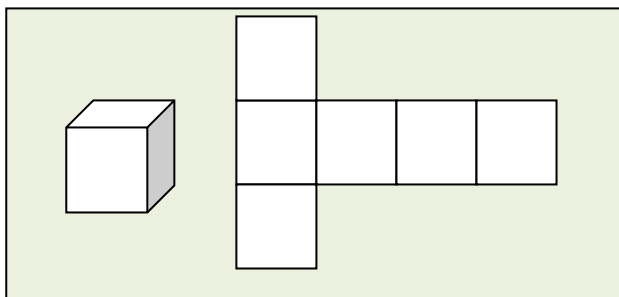
Example : Triangle with side and angles given

- 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

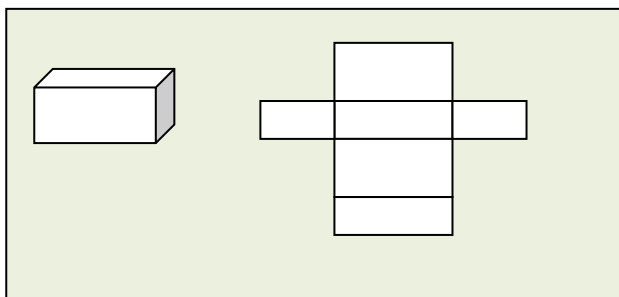


## 23 Construct 3D shapes

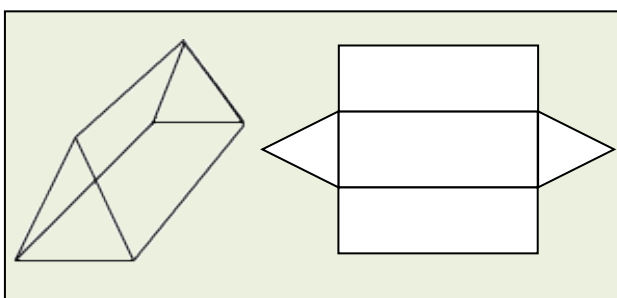
CUBE & its net



CUBOID & its net



TRIANGULAR PRISM & its net

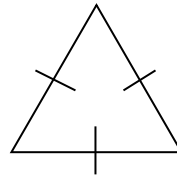


## 24 Properties of shapes

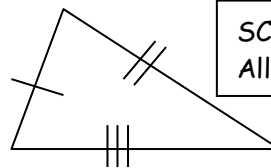
TRIANGLES - sum of angles =  $180^\circ$



ISOSCELES triangle  
2 equal sides & 2 equal angles

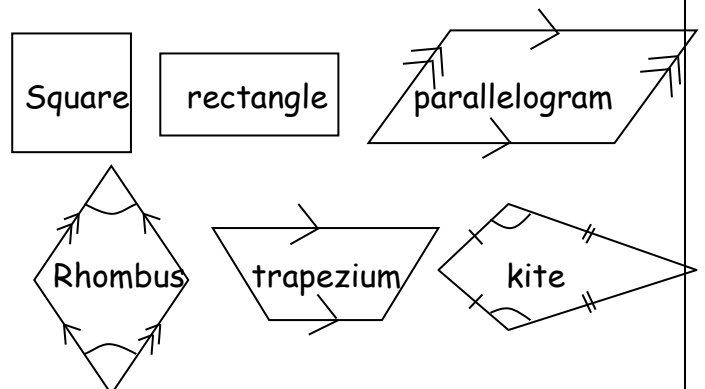


EQUILATERAL triangle  
3 equal sides & ALL angles  $60^\circ$



SCALENE triangle  
All sides & angles different

QUADRILATERALS - sum of angles =  $360^\circ$

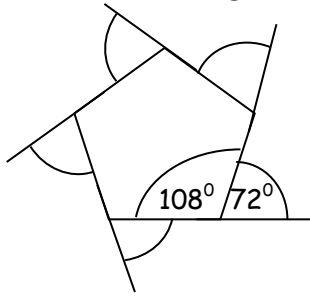


REGULAR POLYGONS - all sides the same

- 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

## Properties of shapes contin..

- Sum of exterior angles is always  $360^\circ$



- interior & exterior angle add up to  $180^\circ$

- the interior angles add up to:

Triangle =  $1 \times 180^\circ = 180^\circ$

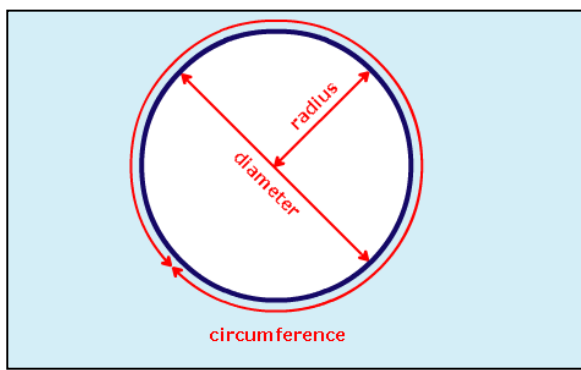
Quadrilateral =  $2 \times 180^\circ = 360^\circ$

Pentagon =  $3 \times 180^\circ = 540^\circ$

Hexagon =  $4 \times 180^\circ = 720^\circ$  etc

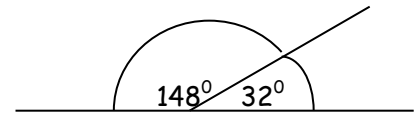
## 25 Parts of a circle

- 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. ( $d = 2 \times r$ ) or ( $r = \frac{1}{2} \times d$ )



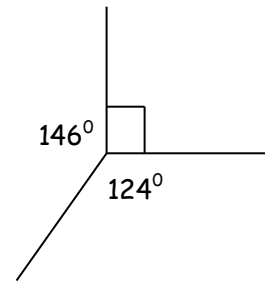
## 26 Angles and straight lines

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



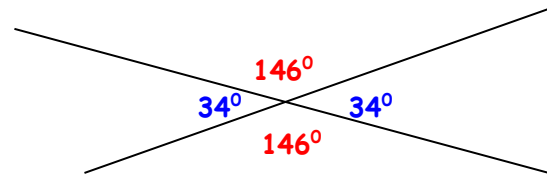
$$148^\circ + 32^\circ = 180^\circ$$

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

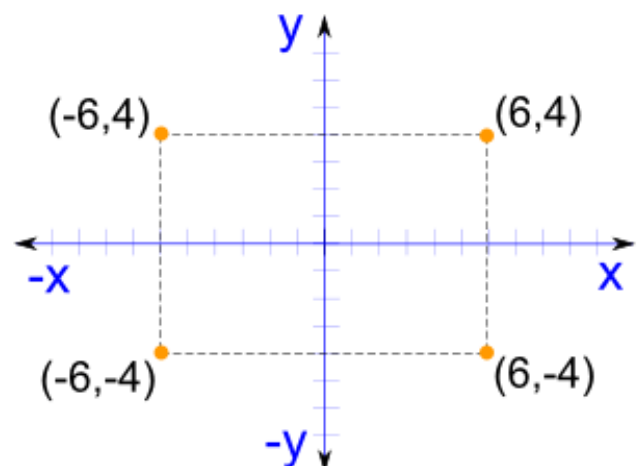


$$146^\circ + 90^\circ + 124^\circ = 360^\circ$$

- Vertically opposite angles are equal



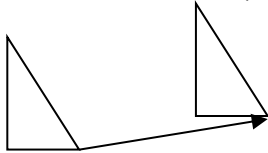
## 27 Position on a co-ordinate grid





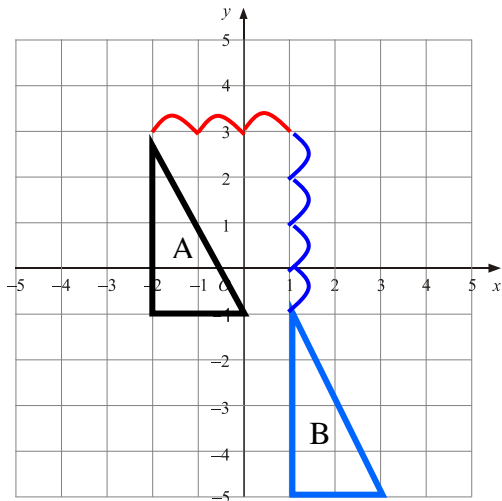
## 28 Transformations

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



Example - Move shape A 3 right & 4 down

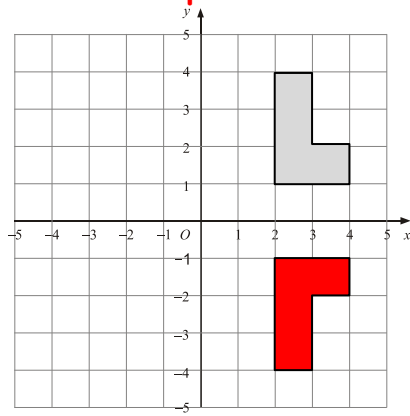
Can also be written as a vector  $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$  Right Down



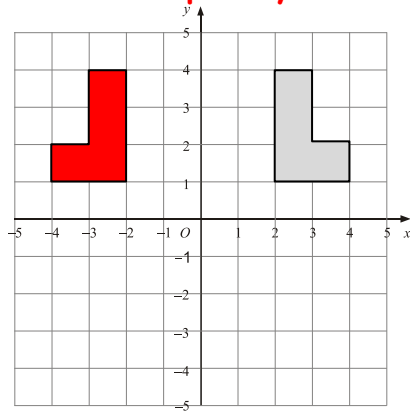
Notice:

- 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**



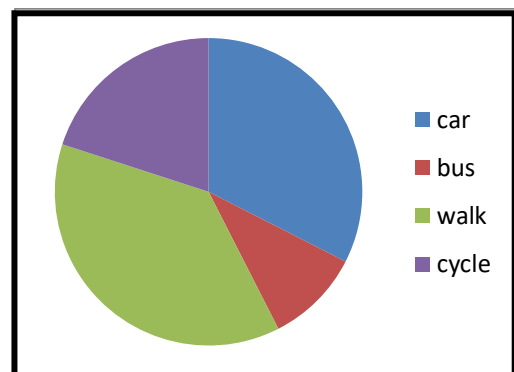
## 29 Graphs

- **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	$8 \times 9 = 72^\circ$

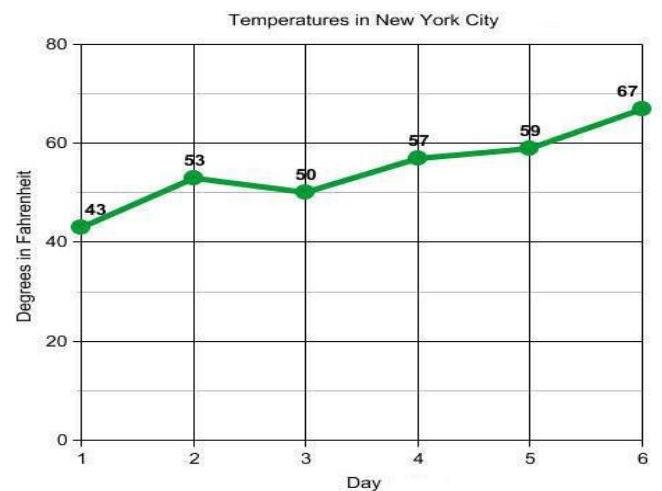
Total frequency = 40

$$360^\circ \div 40 = 9^\circ \text{ per person}$$



- **Line graph**

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



### 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

$$\text{Mean} = \text{total of measures} \div \text{no. of measures}$$

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

Car 1 - 66mph

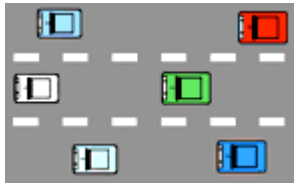
Car 2 - 57mph

Car 3 - 71mph

Car 4 - 54mph

Car 5 - 69mph

Car 6 - 58mph



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

$$= \frac{375}{6}$$

$$= 62.5\text{mph}$$

Mean average speed was 62.5mph