5/1 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 2 00 000
The value of the digit '3' is 3 0 000
The value of the digit '4' is 4 000

5/2 Round numbers to nearest 10, 100, 1000, 10000, 100000

Example 1– Round 3 4 2 679 to the nearest 10 000
  o Step 1 – Find the 'round-off digit' - **4**
  o 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 – 3 4 0 000

Example 2– Round 4 5 3 679 to the nearest 100 000
  o Step 1 – Find the 'round-off digit' - **4**
  o Step 2 – Look one digit to the right - **5**

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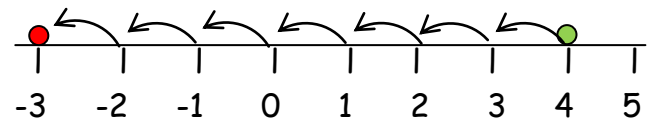   - Replace following digits with zeros

ANSWER – 5 00 000

5/3 Negative numbers
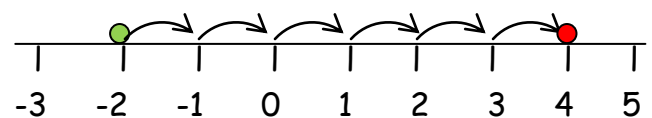
A number line is very useful for negative numbers.
  • The number line below shows:
          4 – 7 = -3

  -3   -2   -1   0   1   2   3   4   5

  • The number line below shows:
          -2 + 6 = 4

  -3   -2   -1   0   1   2   3   4   5

5/4   Roman Numerals

The seven main symbols

I = 1
V = 5
X = 10
L = 50
C = 100
D = 500
M = 1000

Other useful ones include:
IV = 4
IX = 9
XL = 40
XC = 90

5/5 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
```

5/5 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 ³4̶ ¹5
4  2  7  -
2  1  8
```

5/6 Mental methods for addition

- **Start from LEFT to RIGHT**

Example 1 – think of:

45 + **3**2 as **45** + **3**0 + 2

- But in your head say:

45   75   77

Example 2 – think of:

1236 + **4**15 as **1236** + **400** + **10** + 5

- But in your head say:

1236   1636   1646   1651

5/6 Mental methods for subtraction

Example 1 – think of:

56 – **3**2 as **56** – **30** – 2

- But in your head say:

56   26   24

Example 2 – think of:

1236 - **4**15 as **1236** - **400** - **10** - 5

- But in your head say:

1236   836   826   821

5/7 Multi-step problems

Based upon 5/6.

Words associated with addition:

sum   total   add   altogether

Words associated with subtraction:

Subtract   difference   minus   How many more?
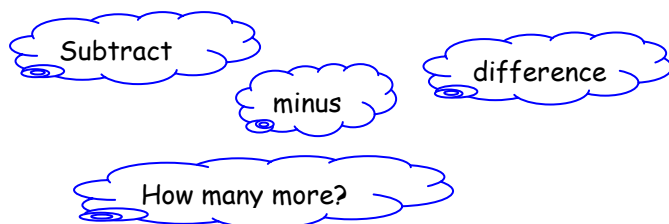
5/8 Multiples & factors

- **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

- **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**

5/9 Prime numbers

Prime numbers have only TWO factors

The factors of 12 are:	Factors of 7 are:
1, 2, 3, 4, 6, 12	**1, 7**
↑	↑
12 is NOT prime	**7 IS prime**
It is composite	

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 factor
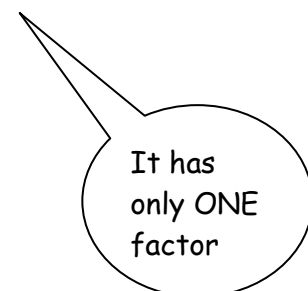
5/10 Multiplication using a formal method

- **By a ONE-DIGIT number**

e.g. 3561 x 7   **COLUMN METHOD**

$$3561$$
$$\underline{\qquad 7x}$$
$$\underline{24927}$$
$$_{3\ 4}$$

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**

$$152$$
$$\underline{\ 34x}$$
$$608 \quad (x4)$$
$$\underline{4560} \quad (x30)$$
$$\mathbf{5168}$$

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**

5/10 Division using a formal method

- **By a ONE-DIGIT number**

e.g. 9138 ÷ 6

$$\begin{array}{r} 1\ 5\ 2\ 6 \\ 6\ \overline{)9^3 1^1 3^1 8} \end{array}$$

- **By a TWO-DIGIT number**

e.g. 4928 ÷ 32   **SAME METHOD**

(Except write down some of your tables down first)

32
64
96
128
160

$$\begin{array}{r} 0\ 1\ \ 5\ \ 4 \\ 32\overline{)4^4 9^{17} 2^{\ 12} 8} \end{array}$$

4928 ÷ 32 = **154**

e.g. 4928 ÷ 32   **ALTERNATE METHOD**
- Divide
- Multiply
- Subtract
- Bring down - Make a new number
- Divide ...

$$\begin{array}{r} 0\ 1\ 5\ 4 \\ 32\overline{)4\ 9\ 2\ 8} \\ \underline{-3\ 2}\ \downarrow \\ 1\ 7\ 2 \\ \underline{-1\ 6\ 0}\ \downarrow \\ 1\ 2\ 8 \\ \underline{-1\ 2\ 8} \\ 0\ 0\ 0 \end{array}$$

4928 ÷ 32 = **154**

5/11 Multiply & divide by 10, 100, 1000

- **By moving the decimal point**

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

e.g. $13 \times 10 = 130$

$3.4 \times 10 = 34$

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

e.g. $13 \div 10 = 1.3$

$3.4 \div 10 = 0.34$
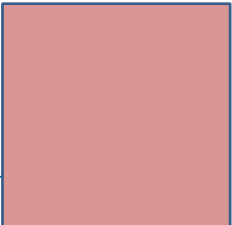
- **By moving the digits**

To multiply by 10 move the digits ONE place LEFT
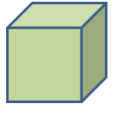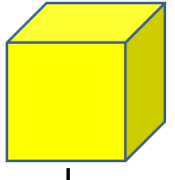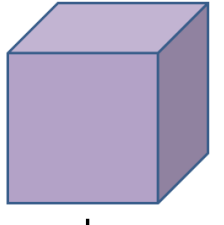
e.g. 3.52×10

$= 3\ 5\ .\ 2$

To multiply or divide by 100 move TWO places
To multiply or divide by 1000 move THREE places

5/12 Square & Cube numbers

Square numbers

	1	2	3	4
	1×1	2×2	3×3	4×4
	1^2	2^2	3^2	4^2
	1	4	9	16

Cube numbers

1×1×1	2×2×2	3×3×3	4×4×4
1^3	2^3	3^3	4^3
1	8	27	64

5/13 Fractions

- To compare fractions
  – the denominators must be the same

$\dfrac{2}{3}$ and $\dfrac{5}{6}$

$\dfrac{4}{6}$ and $\dfrac{5}{6}$

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

- To add and subtract fractions

When the denominators are the same

$\dfrac{5}{8} + \dfrac{1}{8} = \dfrac{6}{8}$ Do not add the denominators

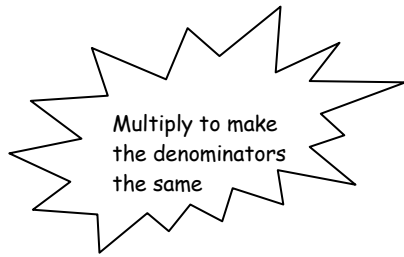$\dfrac{5}{8} - \dfrac{1}{8} = \dfrac{4}{8}$ Do not subtract the denominators

5/13 To add subtract fractions (cont)

When the denominators are different

$$\frac{3}{8} + \frac{1^{(\times2)}}{4^{(\times2)}}$$

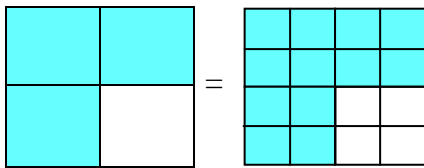$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

Multiply to make the denominators the same

• **A mixed number can be changed back into an improper fraction**

$$1\overset{+}{\underset{\times}{\tfrac{1}{2}}} = \frac{3}{2}$$

$$2\overset{+}{\underset{\times}{\tfrac{3}{4}}} = \frac{11}{4}$$

5/14 Equivalent fractions

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

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

$$\frac{3^{(\times4)}}{4^{(\times4)}} = \frac{12}{16}$$

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

$$\frac{12^{(\div4)}}{16^{(\div4)}} = \frac{3}{4}$$

5/16 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

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

5/15 Mixed & improper fractions

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

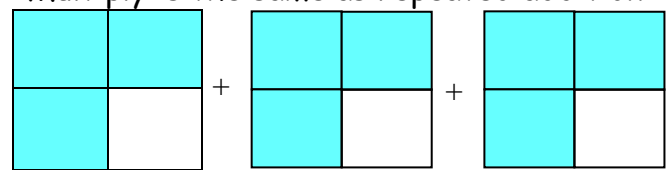$\frac{3}{2}$ can be shown in a diagram

1      $\frac{1}{2}$

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

Improper fraction   Mixed number

5/17 <u>Round decimals</u>

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 **5.6**2 to the nearest whole

'round off' digit   this digit is 5 or more

5.62 rounded to nearest whole = 6

e.g. 2 – To round **5.3**2 to the nearest whole

'round off' digit   this digit is NOT 5 or more

5.32 rounded to nearest whole = 5

- **To one decimal place**

e.g. 1 – To round 12.**37** to 1 decimal place

'round off' digit   this digit is 5 or more

12.37 rounded to 1dp = 12.4

e.g. 2 – To round 12.**32** to the nearest whole

'round off' digit   this digit is NOT 5or more

12.37 rounded to 1dp = 12.3

5/18 <u>Read & write decimals</u>

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				$\frac{617}{1000}$		

5/18 <u>Order decimals</u>

<u>Example</u> – To order 0.28, 0.3, 0.216
- Write them under each other
- **Fill gaps with zeros**
- Then order them
-
0.28 ⟶ 0.28**0**
0.3 ⟶ 0.3**00**
0.216⟶ 0.216

          smallest   largest
Order: 0.216   0.28   0.3

5/19 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'

$$\frac{11\,^{(x4)}}{25\,_{(x4)}} = \frac{44}{100} = 0.44 = 44\%$$
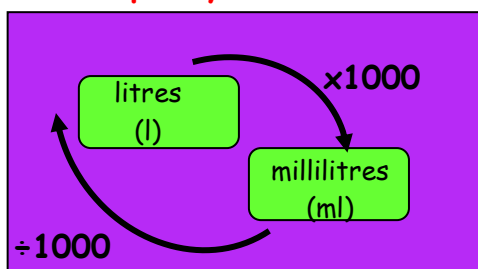
5/20 Convert metric measure

- **Length**
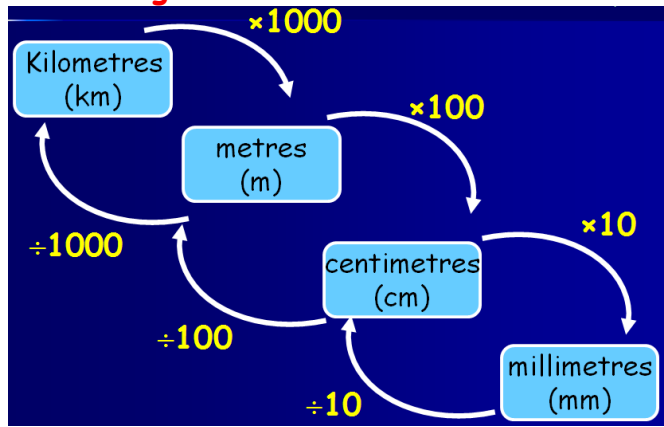
- **Mass or weight**
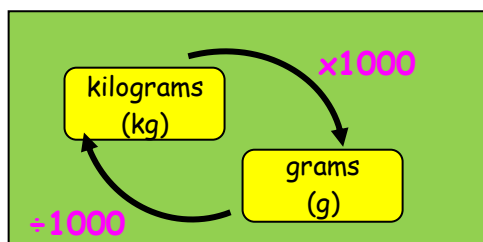
- **Capacity or volume**

5/20 Imperial measure

- 1 inch is about 2.5cm
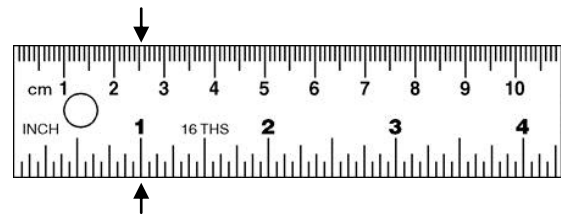
- 1km = 1.6 miles or 5miles = 8km

- 1kg is about 2.2pounds

- A litres of water's a pint and three quarters

- A gallon is about 4.5 litres

5/21 Area & Perimeter

- **Estimate area**
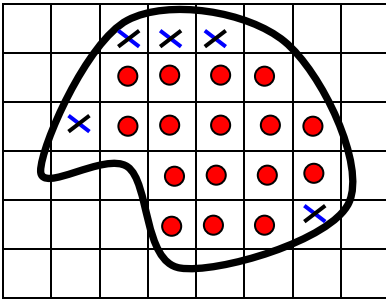
Number of whole squares(●) = 16
Number of ½ or more (✗) = 5
Estimated area = 21 squares

- **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

12cm
4cm   6cm
8cm

12cm
4cm   6cm
8cm
2cm
4cm
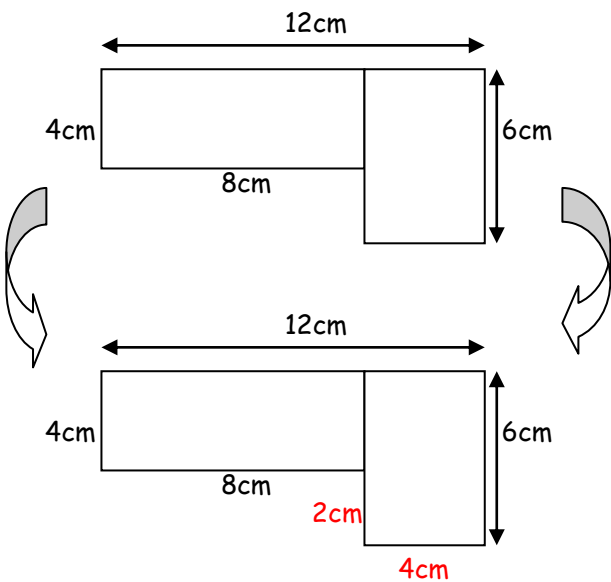
Perimeter = 12 + 6 + 4 + 2 + 8 + 4 = 36cm
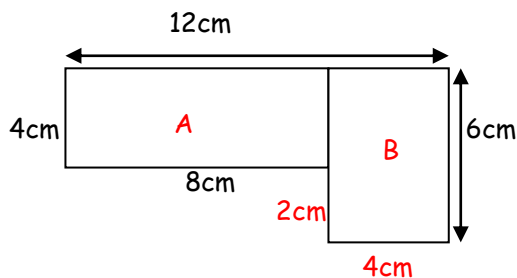
12cm
4cm   A   B   6cm
8cm
2cm
4cm

Area of shape = Area of A + B
= (8x4) + (6x4)
= 32 + 24
= $\underline{56cm^2}$

5/22 Volume

Volume is measured in cubes

The 1 cm cube

1cm
1cm
1cm
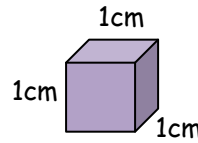
The volume of this cube is 1 cm³
(1 cubic centimetre)
It holds 1ml of water
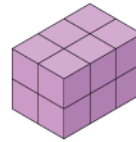
This cuboid contains 12 cubes
So the volume is 12 cm³
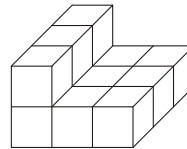
This 3D shape contains 12 cubes
So the volume is 12 cm³
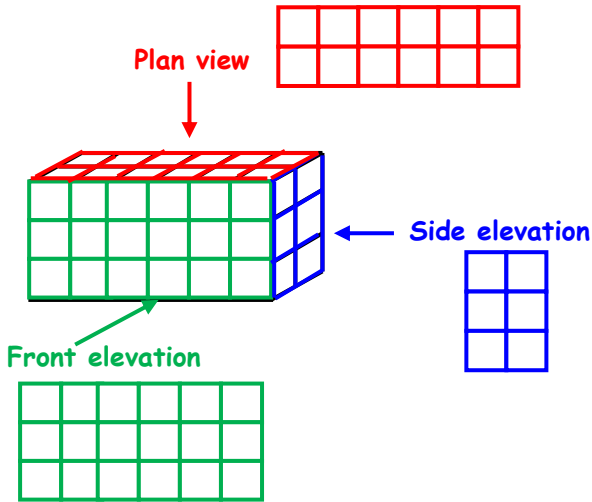
5/23 Units of time

- **Time conversion**

year
x365
days
x24
÷365
hours
x60
÷24
min
x60
÷60
sec
÷60
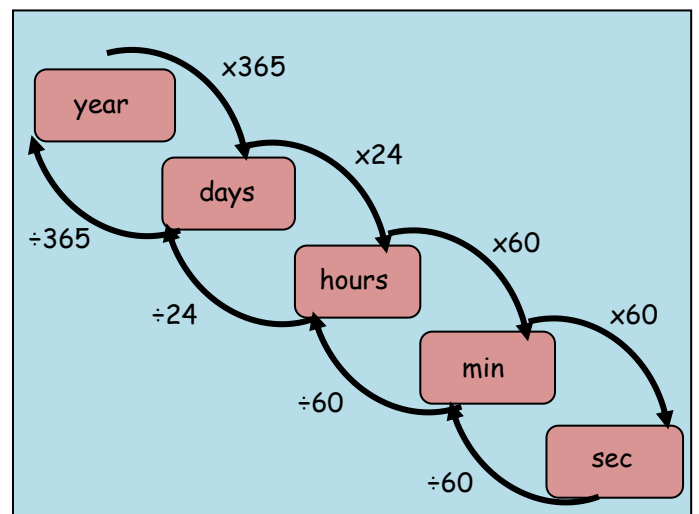
- **Time intervals**

Always go to the next whole hour first

Example: 0830 to 1125

30min + 2h 25min = 2h 55min

0830   0900   1125

5/24 2D representations of 3D shapes

- There are 3 views:

Plan view
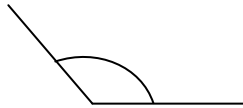
Side elevation

Front elevation

5/25 Angles

- **Types of angles**

Acute
(less than 90^0)
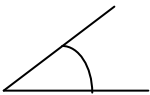
Obtuse
(Between 90^0 & 180^0)
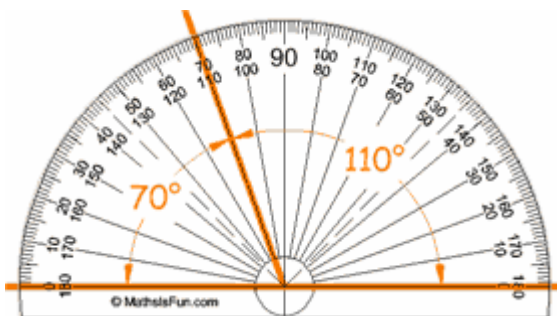

Reflex
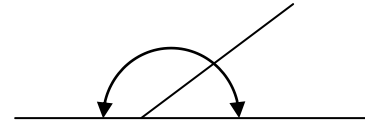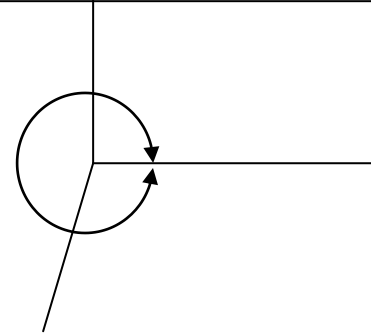(Between 180^0 & 360^0)
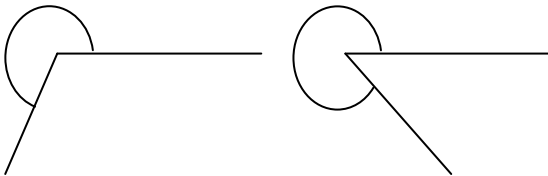
- **Measure and draw angles**

To be sure, count the number of degrees between the two arms of the angle
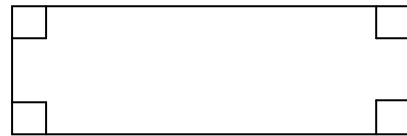
5/26 Angles

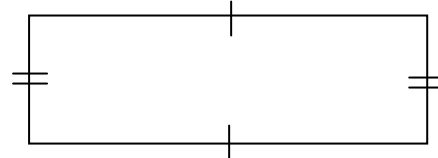Angles on a straight line add up to 180^0 or 2 right angles (2×90^0)

Angles about a point add up to 360^0 or 4 right angles (4×90^0)
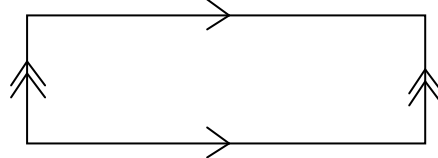
5/27 Properties of the rectangle

- A rectangle is a quadrilateral (4 sided shape)
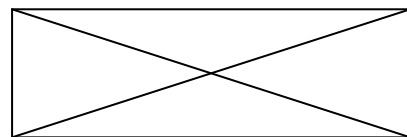- All angles are 90^0
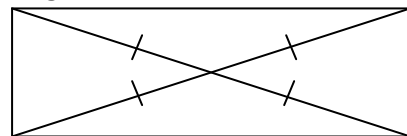

- Opposite sides are equal

- Opposite sides are parallel
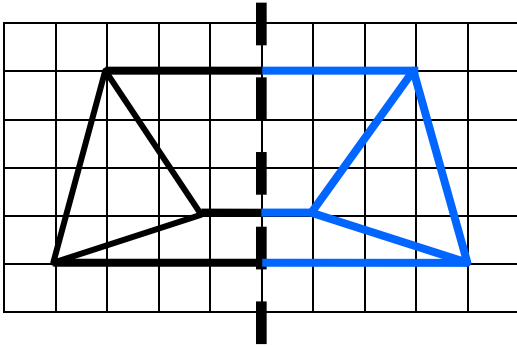

- Diagonals are equal
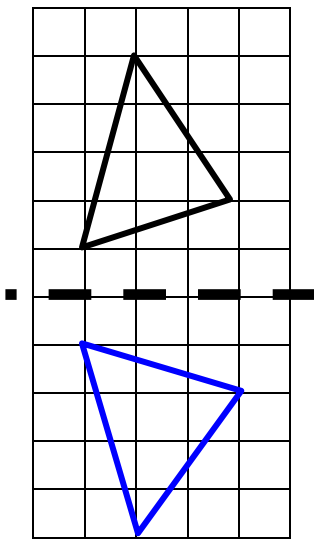

- Diagonals bisect each other (cut in half)

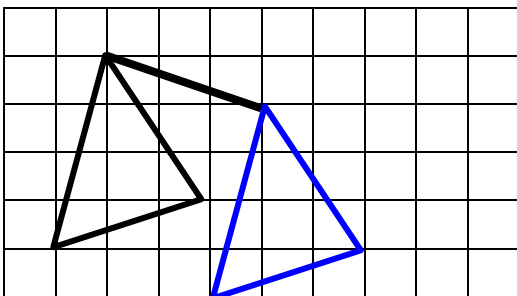- **A square is a special rectangle**

5/28 Reflection

- **Reflection in a vertical line**

- **Reflection in a horizontal line**

5/28 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

5/29 Line graphs

- **Find the difference**

Example 1 : What was the difference in temperature between 1030 and 1130?
Answer: $11.5^0C – 10^0C = 1.5^0C$
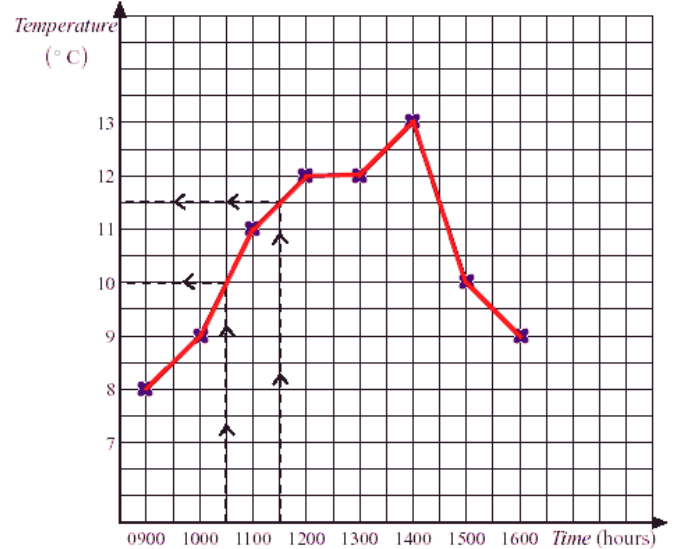
- **Find the sum of the data**

Example: What was the total number of days absent over the 6 years?
Answer: 3 + 4 + 7 + 7 + 9 + 2 = 32 days

5/30 <u>Interpret information in tables</u>

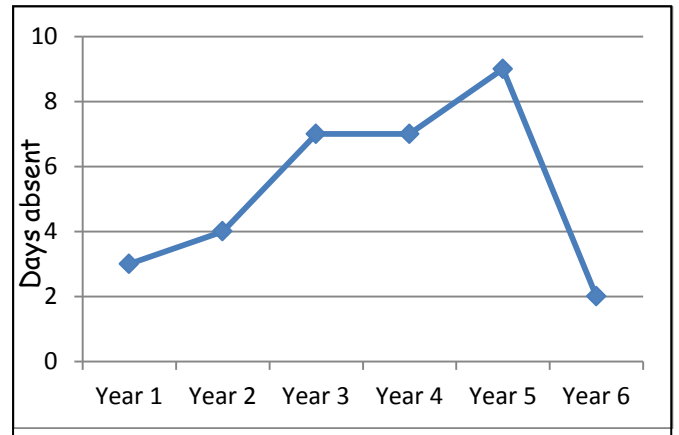- **Distance table**

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

Answer: 40miles

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 = 1h 25min = 85min

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