

### Trial and Improvement

Eg Solve  $x^3 + 2x = 19$  to 1 dp

| x    | $x^3 + 2x$ | big/small |  |
|------|------------|-----------|--|
| 2    | 12         | too small | Find the two whole numbers either side of the answer |
| 3    | 33         | too big   |  |
| 2.5  | 20.625     | too big   | Then find the two numbers to 1dp either side         |
| 2.4  | 18.624     | too small |  |
| 2.45 | 19.606..   | too big   | Try halfway between these to decide which is closest |

|       |      |     |
|-------|------|-----|
| small | big  | big |
| 2.4   | 2.45 | 2.5 |

so  $x = 2.4$  (1 dp)

### Metric units:

**Length** – use mm, cm, m, km

**Area** – use  $\text{mm}^2$ ,  $\text{cm}^2$ ,  $\text{m}^2$ ,  $\text{km}^2$ , (hectares)

**Volume** – use  $\text{mm}^3$ ,  $\text{cm}^3$ ,  $\text{m}^3$ , ml, litres

**Mass** – use g, kg

### Metric Conversions:

1cm = 10mm

1m = 100cm

1m = 1000mm

1km = 1000m

1kg = 1000g

1tonne = 1000kg

1 litre = 1000ml

1 litre = 100cl

### Imperial to metric rough conversions:

5 miles = 8 km

1kg = 2.2 pounds

1 gallon = 4.5 litres

### Key formulae:

**Circumference of circle** =  $\pi d$

**Area of rectangle** = length x width

**Area of triangle** = base x height  $\div 2$

**Area of circle** =  $\pi r^2$

**Volume of cuboid** = length x width x height

**Volume of prism** = cross-section area x length

**perimeter** is the distance round the edge

**area** is the space inside the shape

### Transformations (Remember Terry)

**Translation** (moves the shape in a straight line) – needs a **vector** eg  $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$  means '3 right and 1 down'

**Enlargement** (makes the shape bigger or smaller) – needs a **scale factor** and a **centre of enlargement**

**Reflection** (flips the shape) – needs a **mirror line**

**Rotation** (turns the shape round) – needs an **angle**, **clockwise/anticlockwise** and a **centre of rotation**

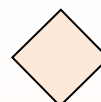
**Congruent shapes** are exactly the same as each other (but may have been turned round or flipped)

The order of **rotational symmetry** of a shape is the number of times it will 'fit on top of its original self' as it completes a full turn.

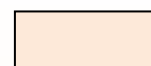
### Names of shapes:



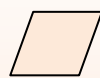
square



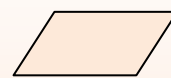
still a square!



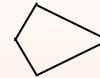
rectangle



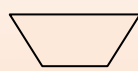
rhombus



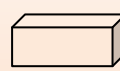
parallelogram



kite



trapezium



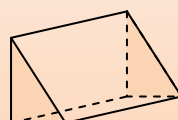
cuboid



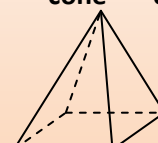
cone



cylinder



triangular prism



square-based pyramid



triangle-based pyramid (tetrahedron)

**Angle Rules:** Opposite angles are equal

Angles at a point add up to  $360^\circ$

Angles in a quadrilateral add up to  $360^\circ$

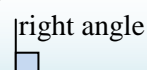
Alternate angles in parallel lines (Z angles) are equal

Corresponding angles in parallel lines (F angles) are equal

Interior angles in parallel lines (C angles) add up to  $180^\circ$

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

Angles in a triangle add up to  $180^\circ$



right angle



acute

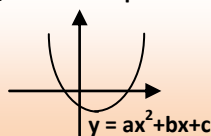


obtuse



reflex

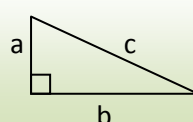
### Quadratic Graphs



### Distance, Speed, Time



### Pythagoras' theorem



$a^2 + b^2 = c^2$  (c is the hypotenuse – the longest side)