YEAR 9 – CONSTRUCTING IN 2D/3D...
Constructions & congruency

What do I need to be able to do?

By the end of this unit you should be able to:
- Draw and measure angles
- Construct scale drawings
- Find locus of distance from points, lines, two lines
- Construct perpendiculars from points, lines, angles
- Identify congruence
- Identify congruent triangles

Keywords

Protractor: piece of equipment used to measure and draw angles
Locus: set of points with a common property
Equidistant: the same distance
Discorectangle: (a stadium) – a rectangle with semi circles at either end
Perpendicular: lines that meet at 90°
Arc: part of a curve
Bisector: a line that divides something into two equal parts
Congruent: the same shape and size

Draw and measure angles Ⓡ

Draw a 35° angle

Make a mark at 35° with a pencil and join to the angle point (use a ruler)
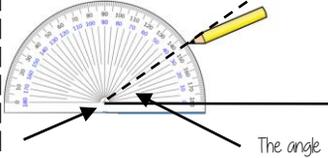
The angle

Make sure the cross is at the end of the line (where you want the angle)

Scale drawings Ⓡ

A picture of a car is drawn with a scale of 1:30

For every 1cm on my image is 30cm in real life

The car image is 10cm

Image : Real life
×10 ⟨ 1cm : 30cm ⟩ ×10
10cm : 300cm

Locus of a distance from a point

All points are equidistant (the same distance) from the fixed point in the middle.
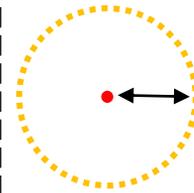
If the point is in the corner it can only make a quarter circle

Equipment needed
The radius is the distance from the fixed point

Locus of a distance from a straight line

All points are equidistant (the same distance) from line
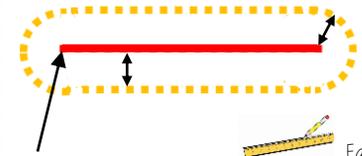
The ends of the line are fixed points

Equipment needed
The line is straight so a ruler is used for the straight lines parallel to your original line

Locus equidistant from two points

Also a perpendicular bisector
Because if the points are joined, this new line intersects it at a 90°

Keep the compass the same size and draw two arcs from each point
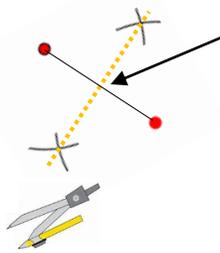
Join the intersections with a ruler.
All points on this line are equidistant from both points

Construct a perpendicular from a point

Point
Line

Use a compass and draw an arc that cuts the line. Use the point to place the compass
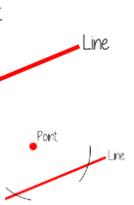
Point
Line

Keep the compass the same distance and now use your new points to make new interconnecting arcs
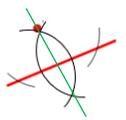
Connecting the arcs makes the bisector

If P is a point on the line the steps are the same

Locus of a distance from two lines

Also an angle bisector
This cuts the angle in half

From the angle vertex draw two arcs that cut the lines forming the angle

Keep the compass the same size and use the new arcs as centres to draw intersecting arcs in the middle

Join the vertex to the intersection

Congruent figures

Congruent figures are identical in size and shape – they can be reflections or rotations of each other

Congruent shapes are identical – all corresponding sides and angles are the same size

B
76°
5 cm
64°
A   3.5 cm   C

L
40°
5 cm
K   3.5 cm   M

$A\hat{C}B = K\hat{M}L$
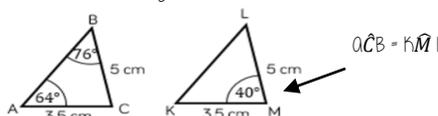
Because all the angles are the same and AC=KM BC=LM triangles ABC and KLM are **congruent**

Constructing Triangles

Link to steps → Ⓡ
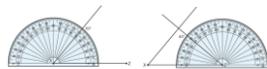
Side, Angle, Angle

Side, Angle, Side

Side, Side, Side

Congruent triangles

Side-side-side
All three sides on the triangle are the same size

Angle-side-angle
Two angles and the side connecting them are equal in two triangles

Side-angle-side
Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes)

Right angle-hypotenuse-side
The triangles both have a right angle, the hypotenuse and one side are the same