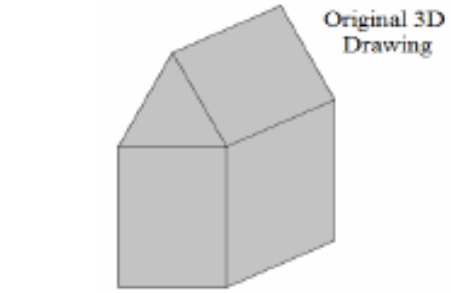
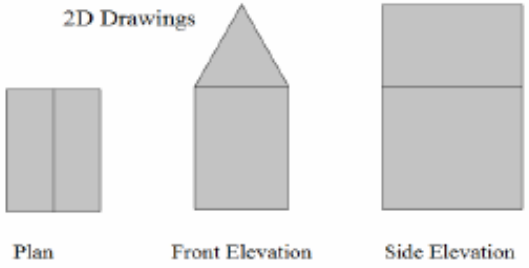
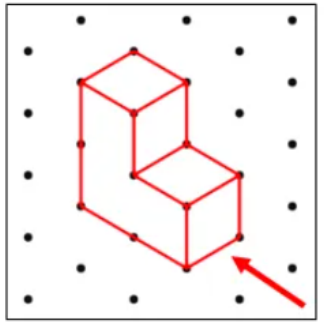
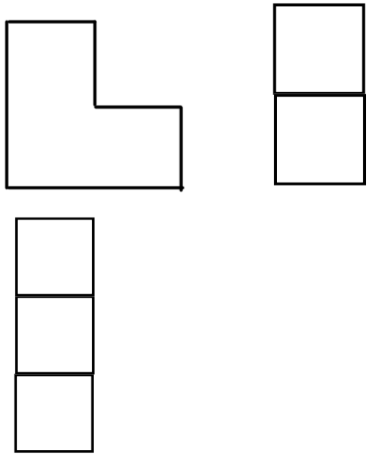
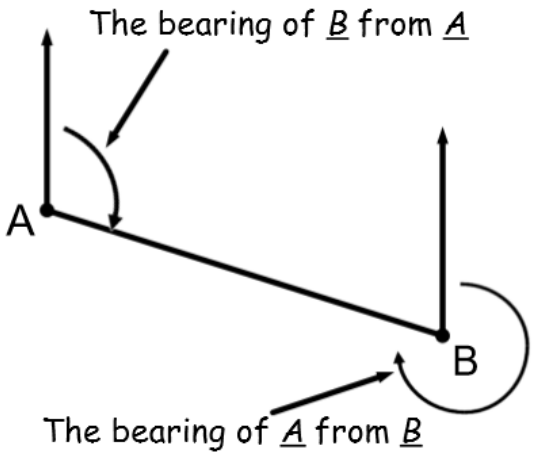
GCSE Mathematics – Unit 15: Constructions, Loci and Bearings **Name:……**

Topic/Skill	Definition/Tips	Example	Your Turn
Plans and Elevations	This takes 3D drawings and produces 2D drawings. **Plan View**: from **above** **Side Elevation**: from the **side** **Front Elevation**: from the **front** **(sometimes they will give you an arrow to show which way is the front, otherwise you need to work it out based on the picture)**	 	 **This time the front is shown with an arrow** Which would be the plan view? 

<table>
<tr>
<td>Bearings</td>
<td>1. Measure from North (draw a North line)
2. Measure clockwise
3. Your answer must have 3 digits (eg. 047°)

Look out for where the bearing is measured <u>from</u>.

Remember your angle facts. Remember that two lines - both pointing north- are parallel!</td>
<td> 
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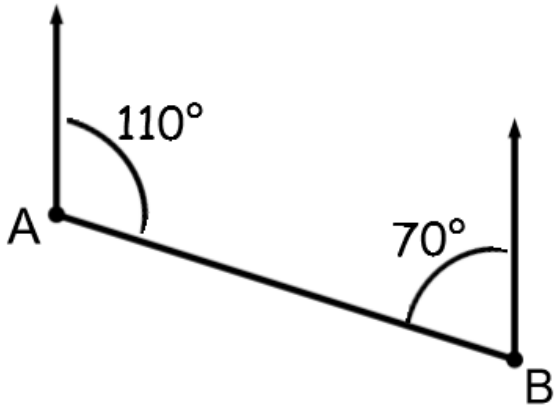
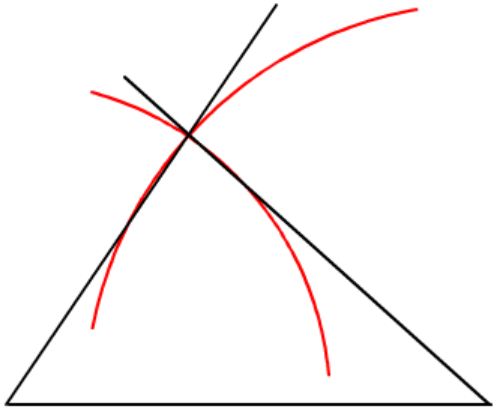
<td> 

Bearing of B from A:
Bearing of A from B:</td>
</tr>
<tr>
<td colspan="2">Constructing Triangles (Side, Side, Side)

1. Draw the base of the triangle using a ruler.
2. Open a pair of compasses to the width of one side of the triangle.
3. Place the point on one end of the line and draw an arc.
4. Repeat for the other side of the triangle at the other end of the line.</td>
<td>  </td>
<td>Draw a triangle with 3cm, 3cm, 2cm</td>
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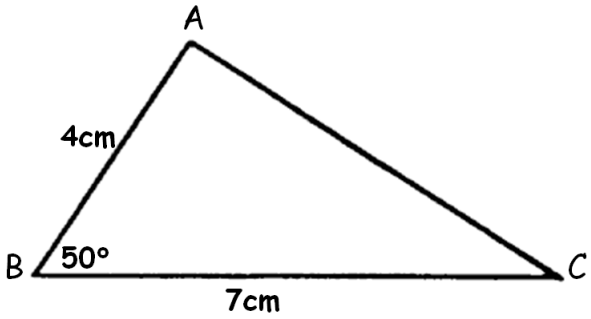
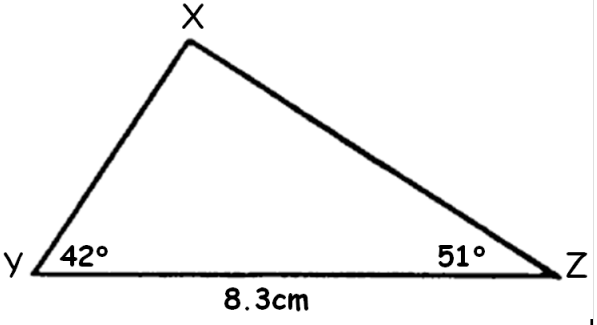
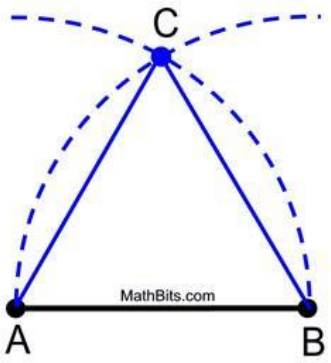
5. Using a ruler, draw lines connecting the ends of the base of the triangle to the point where the arcs intersect.		
Constructing Triangles (Side, Angle, Side) 1. Draw the base of the triangle using a ruler. 2. Measure the angle required using a protractor and mark this angle. 3. Remove the protractor and draw a line of the exact length required in line with the angle mark drawn. 4. Connect the end of this line to the other end of the base of the triangle.		**Draw a triangle with 3cm, 30^0, 2cm**
Constructing Triangles (Angle, Side, Angle) 1. Draw the base of the triangle using a ruler. 2. Measure one of the angles required using a protractor and mark this angle. 3. Draw a straight line through this point from the same point on the base of the triangle. 4. Repeat this for the other angle on the other end of the base of the triangle.		**Draw a triangle with 30^0, 5cm, 60^0**

Constructing an Equilateral Triangle (also makes a 60° angle)

1. Draw the base of the triangle using a ruler.
2. Open the pair of compasses to the exact length of the side of the triangle.
3. Place the sharp point on one end of the line and draw an arc.
4. Repeat this from the other end of the line.
5. Using a ruler, draw lines connecting the ends of the base of the triangle to the point where the arcs intersect.

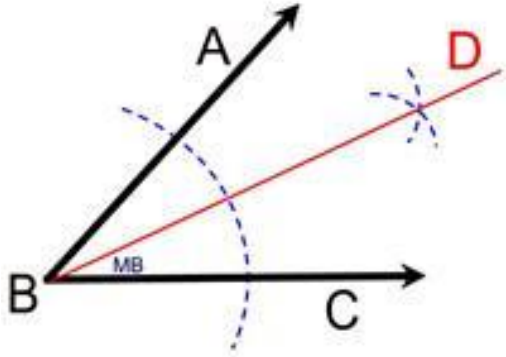


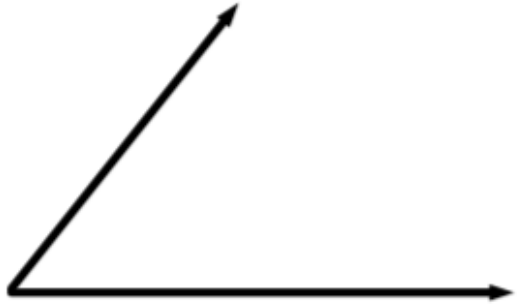
Construct an equilateral triangle:

Angle Bisector

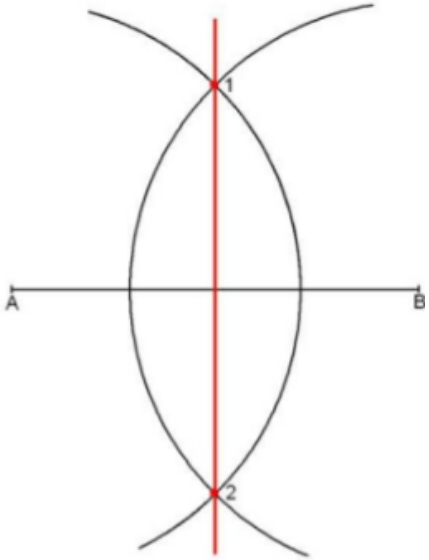
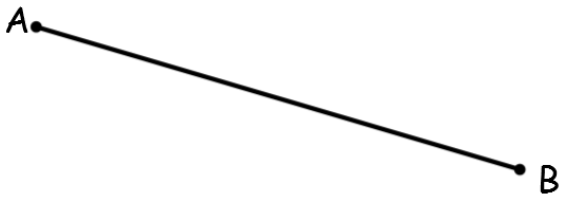
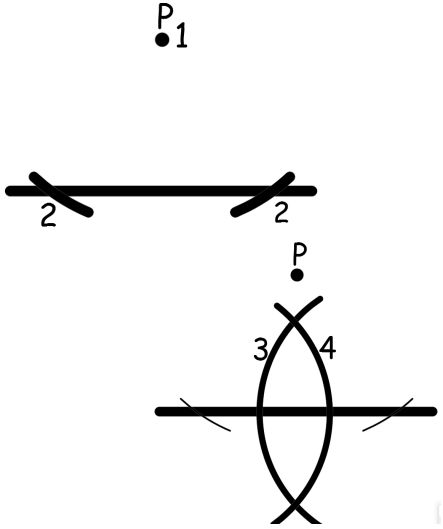
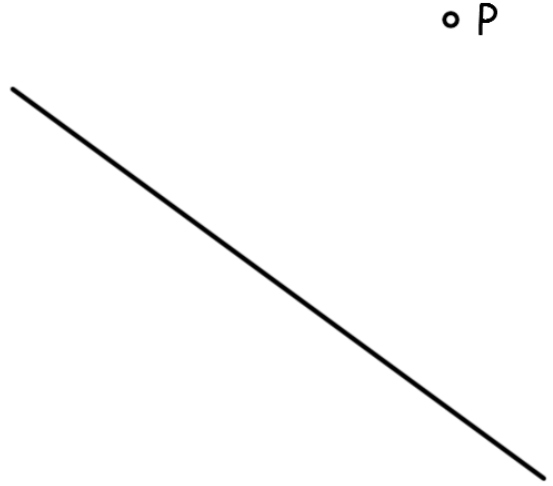
Angle Bisector: Cuts the angle in half.

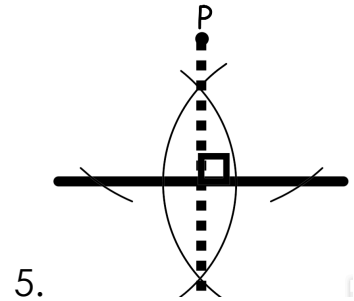
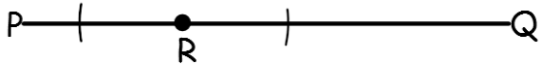
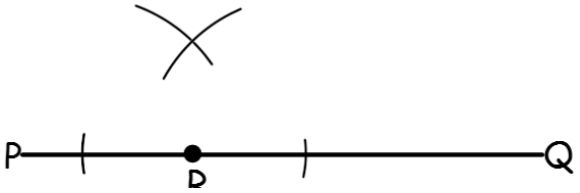
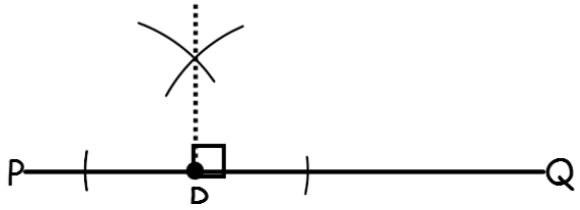
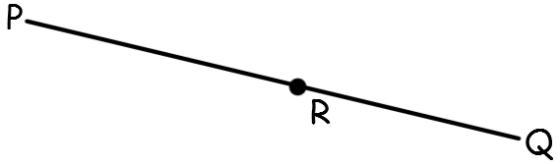
1. Place the sharp end of a pair of compasses on the vertex.
2. Draw an arc, marking a point on each line.
3. Without changing the compass put the compass on each point and mark a centre point where two arcs cross over.
4. Use a ruler to draw a line through the vertex and centre point.





Bisect the angle. Check using a protractor.

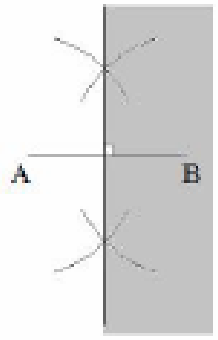
Perpendicular Bisector: Cuts a line in half and at right angles. 1. Put the sharp point of a pair of compasses on A. 2. Open the compass over half way on the line. 3. Draw an arc above and below the line. 4. Without changing the compass, repeat from point B. 5. Draw a straight line through the two intersecting arcs.		
Perpendicular from an External Point The **perpendicular distance** from a point to a line is the **shortest distance** to that line. 1. Put the sharp point of a pair of compasses on the point. 2. Draw an arc that crosses the line twice. 3. Place the sharp point of the compass on one of these points, open over half way and draw an arc above and below the line.		

4. Repeat from the other point on the line. 5. Draw a straight line through the two intersecting arcs.	 5.	
Perpendicular from a Point on a Line Given line PQ and point R on the line: 1. Put the sharp point of a pair of compasses on point R. 2. Draw two arcs either side of the point of equal width (giving points S and T) 3. Place the compass on point S, open over halfway and draw an arc above the line. 4. Repeat from the other arc on the line (point T). 5. Draw a straight line from the intersecting arcs to the original point on the line.	1 & 2.  3 & 4.  5. 	

Loci and Regions

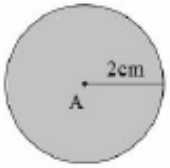
A **locus** is a **path of points that follow a rule**.

For the locus of points **closer to B than A**, create a **perpendicular bisector** between A and B and shade the side closer to B.

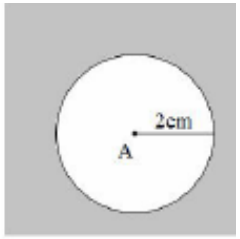


Points Closer to B than A

For the locus of points **equidistant from A**, use a compass to draw a **circle**, centre A.

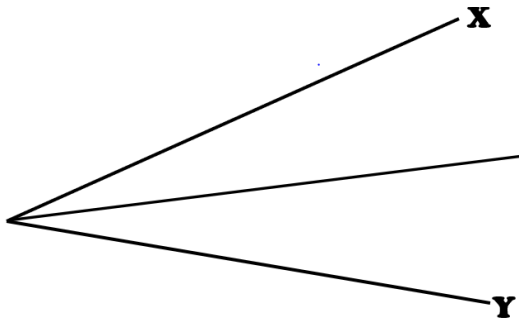


Points less than 2cm from A

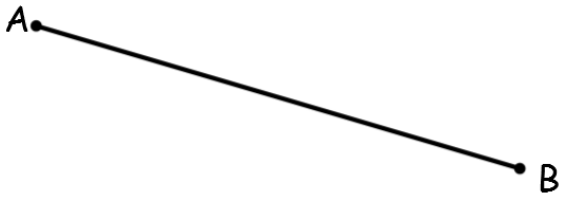


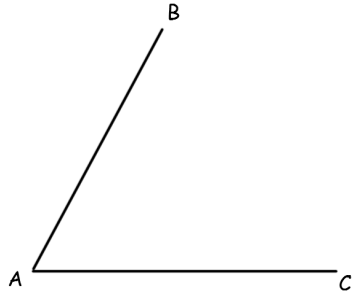
Points more than 2cm from A

For the locus of points **equidistant to line X and line Y**, create an **angle bisector**.

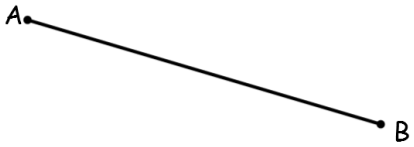


Find the locus of points closer to A than to B





Find the locus of points closer to AB than to AC

For the locus of points a set **distance from a line**, create **two semi-circles** at either end joined by **two parallel lines**.		**Find the locus of points 2cm from line AB** 
Equidistant A point is equidistant from a set of objects if the **distances between that point and each of the objects is the same**.