

Constructions And Scale Drawings

Name: _____

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At a glance

Measuring, ruler-and-compasses constructions, nets, scale drawings and three-figure bearings.

1. Measuring and drawing
2. Triangles from three sides
3. Bisectors
4. Nets
5. Scale drawings and bearings

1. Measuring and drawing

☐ I revised this

- Measure lengths to the nearest millimetre and angles to the nearest degree.
- Use the correct scale on the protractor (inner or outer) — start from the 0 on the arm you measure from.
- Leave all construction lines and arcs showing.

Worked example

A line measures 7.4 cm on a drawing with scale 1 cm to 5 m. How long is it in real life?

1. 7.4×5 .

37 m

2. Triangles from three sides

☐ I revised this

- Only a ruler and compasses are allowed.

How to do it

1. Draw the longest side as the base.
2. Set the compasses to the second length; draw an arc from one end.
3. Set them to the third length; draw an arc from the other end.
4. Join the crossing point to both ends.

Worked example

Construct a triangle with sides 7 cm, 5 cm and 6 cm. What do you draw after the 7 cm base?

1. Arc of radius 5 cm from one end.
2. Arc of radius 6 cm from the other end.

Join the point where the arcs cross to both ends

3. Bisectors

☐ I revised this

- **Perpendicular bisector** of AB: arcs of the same radius (more than half AB) from A and from B, above and below; join the crossings. Every point on it is equally far from A and B.
- **Angle bisector**: arc from the vertex cutting both arms; equal arcs from those two points; join the vertex to the crossing. Every point on it is equally far from both arms.

Worked example

Which construction finds the points equally distant from two towns A and B?

1. Equal distance from two points.

The perpendicular bisector of AB

4. Nets

☐ I revised this

- A net is the flat shape that folds into a solid.
- Cube: 6 squares. Cuboid: 3 pairs of rectangles. Triangular prism: 2 triangles + 3 rectangles.
- Square-based pyramid: 1 square + 4 triangles. Cylinder: 1 rectangle + 2 circles.
- The surface area is the area of the net.

Worked example

How many faces does the net of a triangular prism have?

1. 2 triangles and 3 rectangles.

5

5. Scale drawings and bearings

☐ I revised this

- Scale 1 : n: real length = drawing length $\times$ n (watch the units).
- Bearings: measured **from north, clockwise**, written with three figures (045°, 120°, 300°).
- 'Bearing of B from A': stand at A, face north, turn clockwise to B.
- Back bearing (A from B) = bearing $\pm$ 180°.

Formulas

back bearing = bearing $\pm$ 180°

add if less than 180°, subtract if more

Worked example

The bearing of B from A is 070°. Find the bearing of A from B.

1. 070 + 180.

250°

Exam tip: Always draw a north line at the point you measure FROM.

Common mistakes

Don't write	Write instead
✗ Writing a bearing as 45°	✓ Three figures: 045°
✗ Bearing of A from B = bearing of B from A	✓ Add or subtract 180°
✗ Rubbing out construction arcs	✓ Leave them — they earn the marks
✗ Using a protractor in a 'compasses only' construction	✓ Only arcs and a straight edge

In the exam

- Use a sharp pencil; accuracy marks allow about ± 2 mm and $\pm 2^\circ$.
- Check the scale units (cm to km?) before converting.
- For bearings, sketch the diagram with north lines before calculating.

My notes