

Constructions Loci

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Find the perpendicular bisector of a 6cm line AB, step by step.

Step 1 · Set compass width

Open compasses to more than 3cm (half of 6cm)

Step 2 · Draw first set of arcs

From A, draw arcs above and below the line

Step 3 · Draw second set of arcs

From B (same compass width), draw arcs above and below, crossing the first arcs

Step 4 · Connect the intersections

Draw a straight line through both crossing points — this is the perpendicular bisector

Answer: A line through the midpoint of AB, at 90° to AB

Check: Every point on this line is equidistant from A and B ✓

2. Now try one with the steps

Bisect an angle ABC using compasses.

Step 1 · Put the compass point on B

Step 2 · From each of those two crossing points

Step 3 · Join B to where the arcs cross

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What construction is used to find all points equidistant from two given points A and B? [1]

2. Describe the locus of points exactly 4cm from a fixed point P. [2]

3. What tools are required for geometric constructions (and which is NOT allowed)? [2]

4. Describe the locus of a goat tied to a post by a 5m rope, grazing in an open field. [2]
-
-
5. A guard dog is tied to the corner of a rectangular building by a rope. Describe the shape of the region it can patrol (assume the rope is shorter than the building's sides). [3]
-
-
-
6. Two points A and B are 6cm apart. Describe and explain how to find the set of points exactly 4cm from both A and B. [4]
-
-
-
-
7. Which construction cuts an angle exactly in half? [1]
-
-
8. An angle of 70° is bisected. What size is each of the two new angles? [1]
-
-
9. What is the shortest distance from a point to a straight line? [1]
-
-
10. Treasure is buried closer to tree A than to tree B. Which line do you construct to show where it could be? [2]
-
-
11. Describe the locus of points exactly 2 cm from a line segment AB. [3]
-
-
-
12. Describe the locus of points that are the same distance from two straight lines that cross. [2]
-
-

13. How can you construct an angle of 60° with only compasses and a straight edge? [2]

14. A lighthouse can be seen from up to 15 km away. What radius of circle, in cm, shows this on a map with scale 1:500,000? [2]

15. Points A and B are 8 cm apart. How many points are exactly 3 cm from A and exactly 3 cm from B? [2]

16. A goat is tied by a 6 m rope to a corner post inside a square field with 20 m sides. Find the area it can graze, leaving π in your answer. [3]

4. Before you hand it in

Using a protractor to measure and bisect an angle instead of using compasses

True geometric constructions use ONLY compasses and a straight edge (no protractor for measuring angles, no ruler markings for measuring length). Construction marks (the arcs) must be visible and left on the diagram.

Erasing the construction arcs after drawing the final line

Always leave your construction arcs visible — examiners check for them to confirm you used the proper method rather than just estimating or measuring.

Changing the compass width between drawing the arcs from A and from B

Set the compasses once (to more than half of AB) and do not change them until both sets of arcs are drawn.