

4.4 Constructions

Name: _____ Class: _____ Date: _____

KEY WORDS locus

<!-- Session 2 native-skill companion -->

Objective

Practise constructions within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Constructions, loci and geometric conditions · Foundation

Points equally distant from A and B lie on the perpendicular bisector of AB. Points at fixed distance r from C lie on a circle. Points equally distant from two intersecting lines lie on their angle bisectors.

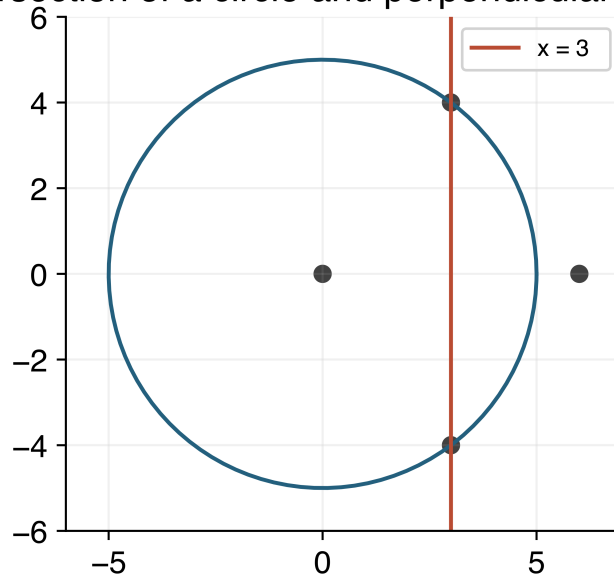
$$x = 3, \quad x^2 + y^2 = 25$$

For A=(0,0) and B=(6,0), the perpendicular bisector is x=3. Points also 5 units from A satisfy $x^2 + y^2 = 25$. Substituting x=3 gives $y^2 = 16$, so (3,4) and (3,-4) satisfy both conditions.

The perpendicular bisector concerns distance to two points; the angle bisector concerns distance to two lines. A sketch is not a ruler-and-compass construction: preserve arcs as evidence of the method.

Translate each condition into a locus before finding intersections. For a region closer to A than B, choose the correct side of the perpendicular bisector and show whether a boundary is allowed.

Intersection of a circle and perpendicular bisector



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Find the midpoint x-coordinate between (0,0) and (6,0).

2.2 (Foundation) Find the positive y-coordinate on $x=3$ and $x^2+y^2=25$.

2.3 (Foundation) Find the distance from (3,4) to (0,0).

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Points equally distant from two points always lie on their angle bisector.

Solutions

2.1 Midpoint x-coordinate = $(0+6)/2=3$.

2.2 At $x=3$, $y^2=25-9=16$. The positive y-coordinate is 4.

2.3 Distance = $\sqrt{3^2+4^2}=5$.

3.1 False. $A=(-1,0)$, $B=(1,0)$: all points $(0,y)$ are equally distant from A and B, forming the perpendicular bisector of AB. Two points alone do not specify the vertex and two arms of an angle bisector.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.