Planner

Constructions (1)

Keywords

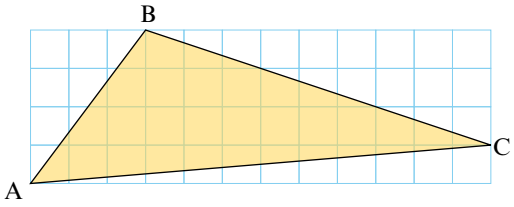
- Constructing a perpendicular bisector
- Bisecting an angle
- Constructing a perpendicular from a point to a line
- Constructing a perpendicular from a point on a line
- Using a ruler and compasses to construct a right-angled triangle, given the longest side and another side

You should know

explanation 1a | explanation 1b | explanation 1c | explanation 1d | online

1 Practise using a pair of compasses to construct perpendicular bisectors of lines that are not horizontal or vertical.
Make sure that you are confident that you can do this type of construction well.

2 Using a ruler and pencil, draw triangle ABC on squared paper.



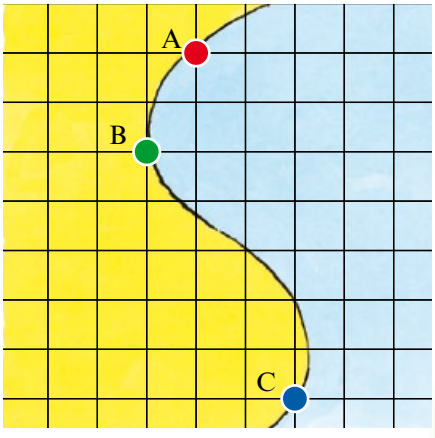
a Construct the perpendicular bisector of side AB.

b Construct the perpendicular bisector of side BC.

c What do you notice about the distance of the point of intersection of the two perpendicular bisectors from A, B and C?

3 The diagram shows a shoreline.

Three people stand at A, B and C. They each see a boat out at sea. The boat is equidistant from each of the three people.
Copy the diagram. By construction, locate the position of the boat, P.



Use what you found out in question **2** to help you.

explanation 2a | explanation 2b | explanation 2c | explanation 2d | online

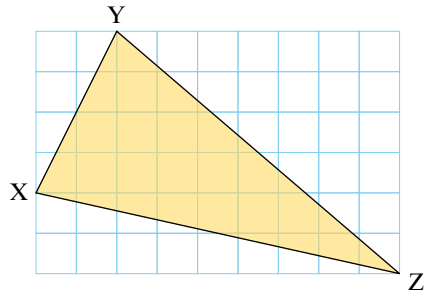
4 Practise using a pair of compasses to construct angle bisectors.
Bisect angles of different sizes, including some acute and some obtuse.
Make sure that you are confident that you can do this type of construction well.

5 **a** Using a protractor, draw an angle of 70°.

b By construction, bisect the angle.

c Using a protractor, check that the angle has been bisected.

6 Draw triangle XYZ on squared paper.



a By construction, bisect angle X.

b By construction, bisect angles Y and Z.

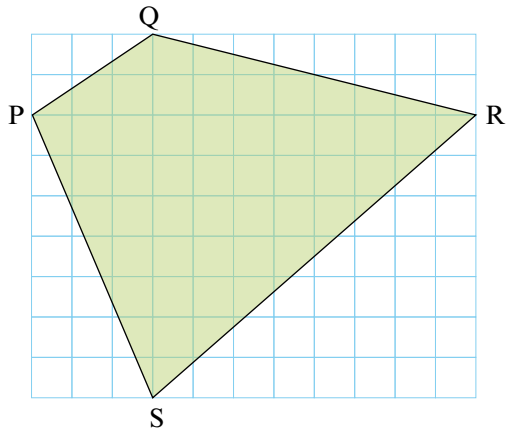
c What do you notice about the three angle bisectors?

7 The diagram shows a field PQRS.

The farmer wants to plant a hedge that bisects the corner of his field at P.

a Copy the diagram onto squared paper.

b By construction, show where the hedge will be planted.



8 You can construct an angle by bisecting a larger one.

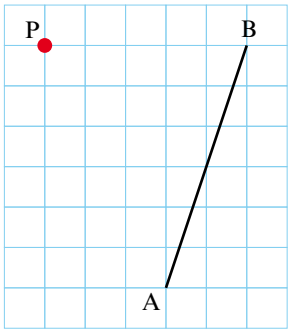
a Draw a line and construct the perpendicular bisector.

b By construction, show how an angle of 45° can be formed.

explanation 3a | explanation 3b | explanation 3c | explanation 3d | online

9 Practise using a pair of compasses to construct the perpendicular from a point to a line that is not horizontal or vertical.
Make sure that you are confident that you can do this type of construction well.

10 Copy this diagram onto squared paper.



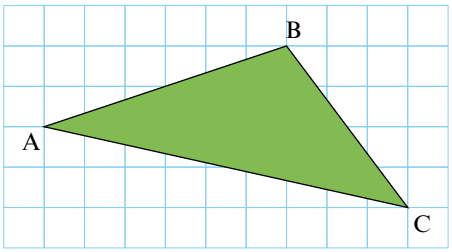
a Construct the shortest line segment from P to the line AB.

Label the point where the two lines meet Q.

b You can construct an angle of 45° by bisecting a right angle.

Without using a protractor, mark and label a point R so that angle PQR = 45° and PQ = QR.

11 Copy triangle ABC onto centimetre-squared paper.



a Construct the line perpendicular to BC that passes through A.
You may find it helpful to extend line BC.

Mark the point X on this line so that B lies on XC.

b The area of triangle ABC is given by

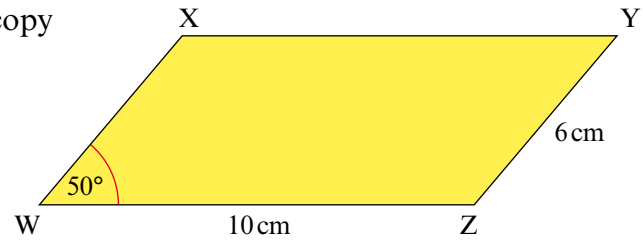
$\frac{1}{2}$ × length BC × length AX

By measuring BC and AX, calculate the area of the triangle.

explanation 4a | explanation 4b | explanation 4c | online

12 Practise constructing a perpendicular from a point on a line that is not horizontal or vertical. Make sure that you are confident that you can do this type of construction well.

13 Using a ruler and protractor, copy the parallelogram WXYZ.



a By construction, bisect angle WZY.

b Mark a point, P, 4 cm from Z on the line constructed in part **a**.

c Construct the shortest line from P to the line WZ. Measure its length.

d Construct the shortest line from P to YZ. Measure its length.

14 Follow the instructions to draw a diagram. Make a sketch first.

a Draw a line PQ 8 cm long. Mark two points X and Y on it so that PX = 3 cm and PY = 5 cm.

b Construct perpendiculars to the line PQ, passing through X and Y. Label the lines XW and YZ.

c Mark a point S on XW so that XS = 4 cm.

d Mark a point R on YZ so that YR = 4 cm.

e Draw the quadrilateral PQRS. What type of quadrilateral is PQRS?

f Measure the lengths PS and QR.

explanation 5

15 Draw a right-angled triangle where the longest side is 13 cm and another side is 5 cm.
Measure the length of the third side.

16 A painter rests her ladder against a wall. The ladder is 8 metres long and rests on the horizontal ground 2 metres from the wall.

a Use 1 cm to represent 1 m to construct a scale diagram.

b Measure how far up the wall the ladder rests, and the angle it makes with the ground.

17 Construct a quadrilateral ABCD with a diagonal AC of 10 cm, two opposite sides of 6 cm and 7 cm, and two right angles that are not cut by AC.