

Constructions

Year 7 About 80 minutes No calculator 45 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-constructions/

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark]

An angle of 84° is cut in half. How big is each half?

Answer

A2 Needed today [1 mark]

A line is 9.4 cm long. How far is its mid-point from each end?

Answer

A3 Last lesson [1 mark]

A 3 cm by 5 cm rectangle is enlarged by scale factor 4. How long is its longer side now?

Answer

A4 From chapter 1 [1 mark]

Work out $-8 + 3 \times (-2)$.

Answer

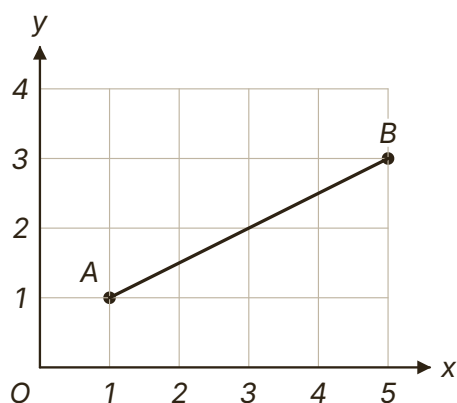
B Example, then your turn

Year 7

Use a ruler and compasses, and leave all your arcs. Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

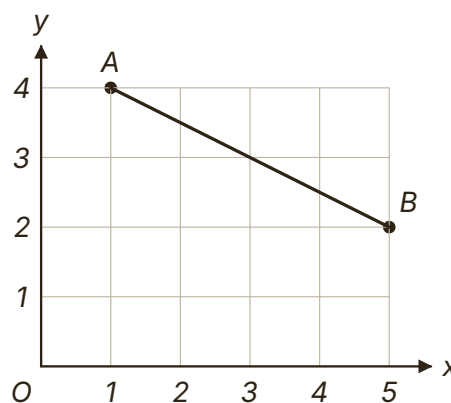
On the grid, construct the perpendicular bisector of AB . Write down the mid-point of AB , and where the bisector crosses the x -axis.



Hint Set your compasses to more than half of AB . Draw arcs from A and B , above and below, with the same setting.

B1 [3 marks]

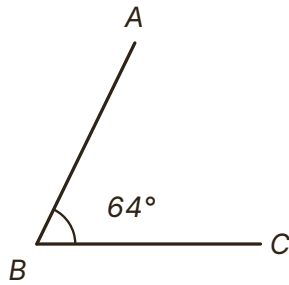
On the grid, construct the perpendicular bisector of AB . Write down the mid-point of AB , and where the bisector crosses $y = 1$.



Answer

EXAMPLE 2

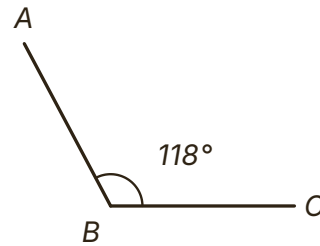
On the diagram, construct the bisector of angle ABC . Measure the two angles you have made.



Hint Draw an arc from B that cuts both arms. From those two points draw two equal arcs that cross. Join B to the crossing.

B2 On the diagram, construct the bisector of angle ABC . [3 marks]

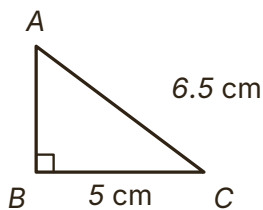
Measure the two angles you have made.



Answer

EXAMPLE 3

Construct the triangle ABC with $BC = 5$ cm, angle $ABC = 90^\circ$ and $AC = 6.5$ cm. Measure AB .

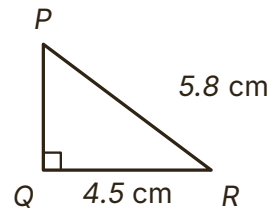


Not drawn accurately

Hint Draw BC longer than you need. Construct the perpendicular at B . Then set your compasses to 6.5 cm and draw an arc from C .

B3 Construct the triangle PQR [3 marks]

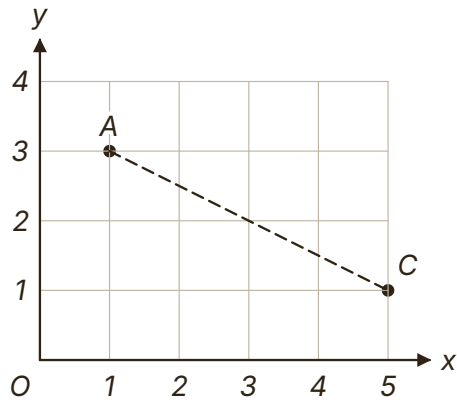
with $QR = 4.5$ cm, angle $PQR = 90^\circ$ and $PR = 5.8$ cm. Measure PQ .



Not drawn accurately

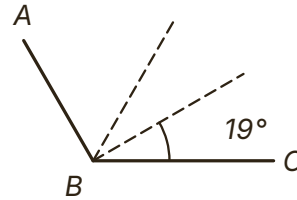
Answer

- C1** A and C are opposite corners of the rhombus $ABCD$. On the grid, construct the perpendicular bisector of AC . B is on the line $y = 4$ and D is on the x -axis. Write down B and D . [3 marks]



Answer

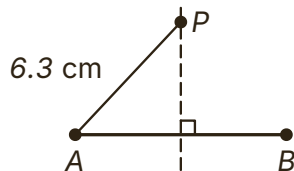
- C2** Angle ABC is bisected. Then the half next to BC is bisected again. The smallest angle made is 19° . What was the size of angle ABC ? [3 marks]



Not drawn accurately

Answer

- C3** P is on the perpendicular bisector of AB . $PA = 6.3$ cm. Write down the length of PB . Give a reason. [2 marks]



Not drawn accurately

Answer

D1

Priya wants to construct the perpendicular bisector of a line AB that is 9 cm long. She says, "I will set my compasses to 4 cm for the arcs from A and from B ."

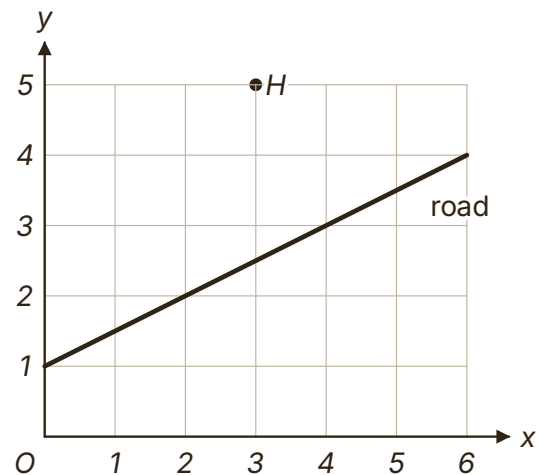
[5 marks]

Explain why her construction will not work. Write down a radius she could use. How far from A will the bisector cross AB , and at what angle?

D2 The grid shows a straight road and a house H . On the grid, construct the shortest path from H to the road. Write down the coordinates of the point where the path meets the road.

[4 marks]

Answer

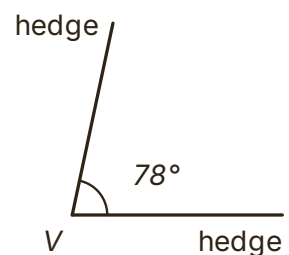


D3 Two straight hedges meet at V . A path from V is always the same distance from both hedges.

(a) On the diagram, use a ruler and compasses to construct the path.

[2 marks]

(b) Work out the angle between the path and each hedge. [1 mark]



Answer

(c) A tree on the path is 4.6 m from one hedge. How far is it from the other hedge? [2 marks]
Give a reason.

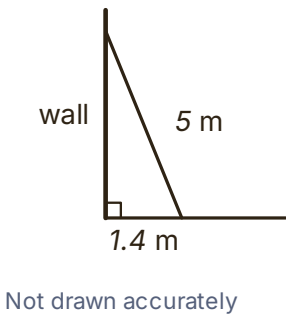
Answer

Total for D3: 5 marks

D4

A ladder 5 m long leans against a vertical wall. Its foot is on level ground, 1.4 m from the wall. Use a scale of 1 cm to 1 m. Construct an accurate scale drawing in the space. Then work out how high up the wall the ladder reaches, and measure the angle between the ladder and the ground.

[5 marks]



Not drawn accurately

Answer

E

Extension

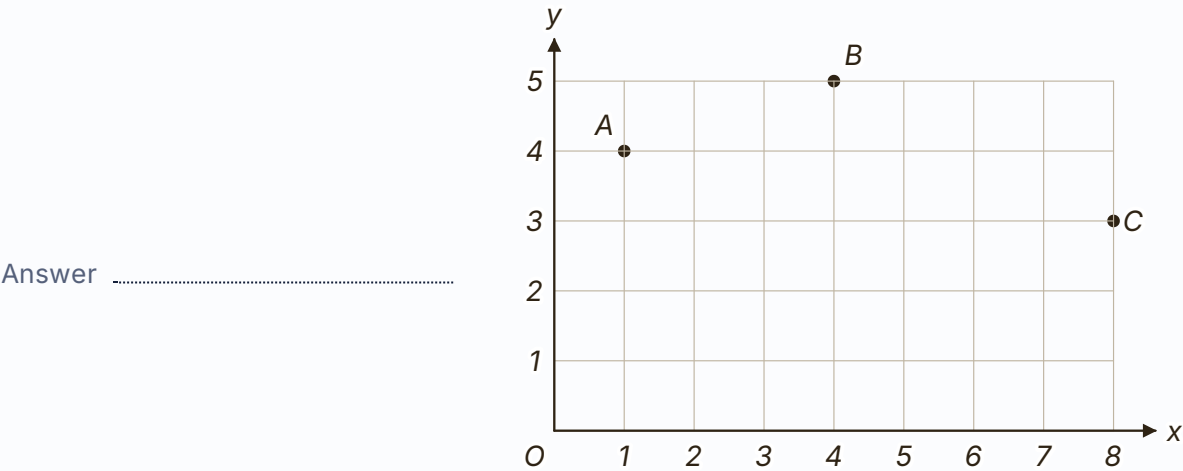
Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

E1

A circle passes through the points A , B and C on the grid. Use constructions to find the coordinates of the centre of the circle. Then write down the radius of the circle, in grid squares.

[5 marks]



Extension hints

Cover these with paper. Uncover one at a time.

- E1
- Hint 1

The centre is the same distance from A as from B . Which line holds every point like that?
- Hint 2

Construct the perpendicular bisector of AB and the perpendicular bisector of BC . The centre is where they cross.
- Hint 3

They cross at $(4, 0)$. B is 5 squares above $(4, 0)$, so the radius is 5.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can construct the perpendicular bisector of a line and the bisector of an angle.

☐
☐
☐
- I can construct a perpendicular from a point to a line and at a point on a line.

☐
☐
☐
- I can construct a right-angled triangle and measure its sides and angles.

☐
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