



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Constructions, Loci & Bearings · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Constructions, Loci & Bearings

Total marks available: 102

● Constructions, Loci & Bearings

✓055°

Q1 · ● Developing · 3 marks

METHOD

Bearing of H from M = $235^\circ - 180^\circ = 055^\circ$ (N at H and N at M are parallel; alternate angles)

✓120°

Q2 · ● Developing · 3 marks

METHOD

Bearing of C from A = $070^\circ + 50^\circ = 120^\circ$

✓050°

Q3 · ● Developing · 3 marks

METHOD

Bearing of C from A = $010^\circ + 40^\circ = 050^\circ$

✓230°

Q4 · ● Developing · 3 marks

METHOD

Bearing of H from M = $050^\circ + 180^\circ = 230^\circ$ (N at H and N at M are parallel; alternate angles)

✓085°

Q5 · ● Developing · 3 marks

METHOD

Bearing of C from A = $040^\circ + 45^\circ = 085^\circ$

✓205°

Q6 · ● Developing · 3 marks

METHOD

Bearing of H from M = $025^\circ + 180^\circ = 205^\circ$ (N at H and N at M are parallel; alternate angles)

✓ 010°

Q7 · ● Developing · 3 marks

METHOD

Bearing of H from M = $190^\circ - 180^\circ = 010^\circ$ (N at H and N at M are parallel; alternate angles)

✓ 125°

Q8 · ● Developing · 3 marks

METHOD

Bearing of H from M = $305^\circ - 180^\circ = 125^\circ$ (N at H and N at M are parallel; alternate angles)

✓ 140°

Q9 · ● Developing · 3 marks

METHOD

Bearing of C from A = $100^\circ + 40^\circ = 140^\circ$

✓ 095°

Q10 · ● Developing · 3 marks

METHOD

Bearing of C from A = $055^\circ + 40^\circ = 095^\circ$

✓ a pair of lines parallel to the given line, one on each side

Q11 · ● Secure · 2 marks

METHOD

a pair of lines parallel to the given line, one on each side (the standard locus for this condition).

✓ the perpendicular bisector of the line joining the two points

Q12 · ● Secure · 2 marks

METHOD

the perpendicular bisector of the line joining the two points (the standard locus for this condition).

✓28.3 m²

Q13 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 3^2 = 28.3 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓50.3 m²

Q14 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 4^2 = 50.3 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓ the angle bisector of the angle between the two lines

Q15 · ● Secure · 2 marks

METHOD

the angle bisector of the angle between the two lines (the standard locus for this condition).

✓314.2 m²

Q16 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 10^2 = 314.2 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓ a circle centred on the point

Q17 · ● Secure · 2 marks

METHOD

a circle centred on the point (the standard locus for this condition).

✓50.3 m²

Q18 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 4^2 = 50.3 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓153.9 m²

Q19 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 7^2 = 153.9 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓254.5 m²

Q20 · ● Secure · 3 marks

METHOD

$$\text{Area} = \pi r^2 = \pi \times 9^2 = 254.5 \text{ m}^2 \text{ (to 1 d.p.)}$$

✓(a) 30 km, (b) 050°

Q21 · ● Greater Depth · 5 marks

METHOD

$$\text{(a) Real distance} = 12 \times 2.5 = 30 \text{ km}$$

$$\text{(b) Bearing of Q from P} = 230^\circ - 180^\circ = 050^\circ$$

✓(a) 22 km, (b) 200°

Q22 · ● Greater Depth · 5 marks

METHOD

$$\text{(a) Real distance} = 11 \times 2 = 22 \text{ km}$$

$$\text{(b) Bearing of Q from P} = 020^\circ + 180^\circ = 200^\circ$$

✓(a) 20 km, (b) 015°

Q23 · ● Greater Depth · 5 marks

METHOD

$$\text{(a) Real distance} = 5 \times 4 = 20 \text{ km}$$

$$\text{(b) Bearing of Q from P} = 195^\circ - 180^\circ = 015^\circ$$

✓(a) 4 km, (b) 260°

Q24 · ● Greater Depth · 5 marks

METHOD

$$\text{(a) Real distance} = 4 \times 1 = 4 \text{ km}$$

$$\text{(b) Bearing of Q from P} = 080^\circ + 180^\circ = 260^\circ$$

- draw the angle bisector(s) of the two lines and a circle of radius 4 cm
✓ centred at O; the points satisfying both conditions are where the bisector(s) cross the circle

Q25 · ● Greater Depth · 3 marks

METHOD

draw the angle bisector(s) of the two lines and a circle of radius 4 cm centred at O; the points satisfying both conditions are where the bisector(s) cross the circle (each condition drawn separately, then intersected).

- ✓ (a) 30 km, (b) 280°

Q26 · ● Greater Depth · 5 marks

METHOD

(a) Real distance = $12 \times 2.5 = 30$ km

(b) Bearing of Q from P = $100^\circ + 180^\circ = 280^\circ$

- draw the perpendicular bisector of AB and a circle of radius 5 cm centred
✓ at C; the points satisfying both conditions are where the bisector crosses the circle

Q27 · ● Greater Depth · 3 marks

METHOD

draw the perpendicular bisector of AB and a circle of radius 5 cm centred at C; the points satisfying both conditions are where the bisector crosses the circle (each condition drawn separately, then intersected).

- ✓ (a) 10 km, (b) 065°

Q28 · ● Greater Depth · 5 marks

METHOD

(a) Real distance = $4 \times 2.5 = 10$ km

(b) Bearing of Q from P = $245^\circ - 180^\circ = 065^\circ$

✓(a) 7.5 km, (b) 170°

Q29 · ● Greater Depth · 5 marks

METHOD

(a) Real distance = $3 \times 2.5 = 7.5$ km

(b) Bearing of Q from P = $350^\circ - 180^\circ = 170^\circ$

✓(a) 12 km, (b) 000°

Q30 · ● Greater Depth · 5 marks

METHOD

(a) Real distance = $3 \times 4 = 12$ km

(b) Bearing of Q from P = $180^\circ - 180^\circ = 000^\circ$