



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Pythagoras & Trigonometry · 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.

Pythagoras & Trigonometry

Total marks available: 106

● Pythagoras & Trigonometry

✓30.6 cm

Q1 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 18.0^2 + 24.7^2 = 324.0 + 610.09 = 934.09$$

$$c = \sqrt{934.09} = 30.6\text{cm}$$

✓21.3 m

Q2 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 20.4^2 + 6.0^2 = 416.16 + 36.0 = 452.16$$

$$c = \sqrt{452.16} = 21.3\text{m}$$

✓30.7 m

Q3 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 29.8^2 + 7.3^2 = 888.04 + 53.29 = 941.33$$

$$c = \sqrt{941.33} = 30.7\text{m}$$

✓33.5 m

Q4 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 17.3^2 + 28.7^2 = 299.29 + 823.69 = 1122.98$$

$$c = \sqrt{1122.98} = 33.5\text{m}$$

✓28.5 cm

Q5 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 23.2^2 + 16.6^2 = 538.24 + 275.56 = 813.8$$

$$c = \sqrt{813.8} = 28.5\text{cm}$$

✓36.1m

Q6 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 20.3^2 + 29.9^2 = 412.09 + 894.01 = 1306.1$$

$$c = \sqrt{1306.1} = 36.1\text{m}$$

✓25.6 cm

Q7 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 14.6^2 + 21.0^2 = 213.16 + 441.0 = 654.16$$

$$c = \sqrt{654.16} = 25.6\text{cm}$$

✓22.8 cm

Q8 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 15.9^2 + 16.4^2 = 252.81 + 268.96 = 521.77$$

$$c = \sqrt{521.77} = 22.8\text{cm}$$

✓12.3m

Q9 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 10.1^2 + 7.1^2 = 102.01 + 50.41 = 152.42$$

$$c = \sqrt{152.42} = 12.3\text{m}$$

✓31.0 m

Q10 · ● Developing · 3 marks

METHOD

$$c^2 = a^2 + b^2$$

$$c^2 = 22.5^2 + 21.3^2 = 506.25 + 453.69 = 959.94$$

$$c = \sqrt{959.94} = 31.0\text{m}$$

✓16.2 m

Q11 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 12.1 \times \sin(50^\circ)/\sin(35^\circ) = 16.2\text{m}$$

✓22.4 cm

Q12 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 13.5 \times \sin(72^\circ)/\sin(35^\circ) = 22.4\text{cm}$$

✓26.7 m

Q13 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 16.9 \times \sin(65^\circ)/\sin(35^\circ) = 26.7\text{m}$$

✓13.5 m

Q14 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 13.0 \times \sin(58^\circ)/\sin(55^\circ) = 13.5\text{m}$$

✓23.7 cm

Q15 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 17.9 \times \sin(80^\circ)/\sin(48^\circ) = 23.7\text{cm}$$

✓8.67 cm

Q16 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 7.6 \times \sin(58^\circ)/\sin(48^\circ) = 8.67\text{cm}$$

✓8.75 m

Q17 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 9.7 \times \sin(58^\circ)/\sin(70^\circ) = 8.75\text{m}$$

✓15.6 cm

Q18 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 16.7 \times \sin(50^\circ)/\sin(55^\circ) = 15.6\text{cm}$$

✓8.48 m

Q19 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 10.4 \times \sin(50^\circ)/\sin(70^\circ) = 8.48\text{m}$$

✓9.53 m

Q20 · ● Secure · 4 marks

METHOD

$$a/\sin(A) = b/\sin(B)$$

$$b = a \times \sin(B)/\sin(A) = 8.0 \times \sin(50^\circ)/\sin(40^\circ) = 9.53\text{m}$$

✓67.6 m²

Q21 · ● Greater Depth · 3 marks

METHOD

$$\text{Area} = \frac{1}{2}ab \cdot \sin(C)$$

$$\text{Area} = \frac{1}{2} \times 12.0 \times 14.7 \times \sin(50^\circ) = 67.6\text{m}^2$$

✓17.4 m

Q22 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 12.7^2 + 6.7^2 - 2 \times 12.7 \times 6.7 \times \cos(125^\circ) = 303.79$$

$$a = \sqrt{303.79} = 17.4\text{m}$$

✓8.81 m

Q23 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 13.7^2 + 10.6^2 - 2 \times 13.7 \times 10.6 \times \cos(40^\circ) = 77.56$$

$$a = \sqrt{77.56} = 8.81\text{m}$$

✓17.0 cm

Q24 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 7.4^2 + 16.0^2 - 2 \times 7.4 \times 16.0 \times \cos(85^\circ) = 290.12$$

$$a = \sqrt{290.12} = 17.0\text{cm}$$

✓17.4 cm

Q25 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 8.7^2 + 15.9^2 - 2 \times 8.7 \times 15.9 \times \cos(85^\circ) = 304.39$$

$$a = \sqrt{304.39} = 17.4 \text{ cm}$$

✓46.1 cm²

Q26 · ● Greater Depth · 3 marks

METHOD

$$\text{Area} = \frac{1}{2}ab \cdot \sin(C)$$

$$\text{Area} = \frac{1}{2} \times 6.6 \times 14.2 \times \sin(80^\circ) = 46.1 \text{ cm}^2$$

✓6.1 m

Q27 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 7.7^2 + 6.5^2 - 2 \times 7.7 \times 6.5 \times \cos(50^\circ) = 37.2$$

$$a = \sqrt{37.2} = 6.1 \text{ m}$$

✓27.6 cm²

Q28 · ● Greater Depth · 3 marks

METHOD

$$\text{Area} = \frac{1}{2}ab \cdot \sin(C)$$

$$\text{Area} = \frac{1}{2} \times 6.6 \times 8.5 \times \sin(100^\circ) = 27.6 \text{ cm}^2$$

✓17.0 cm²

Q29 · ● Greater Depth · 3 marks

METHOD

$$\text{Area} = \frac{1}{2}ab \cdot \sin(C)$$

$$\text{Area} = \frac{1}{2} \times 5.0 \times 7.5 \times \sin(65^\circ) = 17.0 \text{ cm}^2$$

✓7.68 cm

Q30 · ● Greater Depth · 4 marks

METHOD

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$a^2 = 7.8^2 + 6.3^2 - 2 \times 7.8 \times 6.3 \times \cos(65^\circ) = 59.0$$

$$a = \sqrt{59.0} = 7.68 \text{ cm}$$