



ACHIEVE ACADEMY

GCSE Maths — Foundation 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: 83

● Pythagoras & Trigonometry

✓20 cm

Q1 · ● Developing · 2 marks

METHOD

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

$$c^2 = 12^2 + 16^2 = 144 + 256 = 400$$

$$c = \sqrt{400} = 20\text{cm}$$

✓6.7 m

Q2 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1.5^2 + 6.5^2 = 2.25 + 42.25 = 44.5$$

$$\text{ladder} = \sqrt{44.5} = 6.671... = 6.7\text{m}$$

✓3.9 m

Q3 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1.8^2 + 3.5^2 = 3.24 + 12.25 = 15.49$$

$$\text{ladder} = \sqrt{15.49} = 3.936... = 3.9\text{m}$$

✓8.2 m

Q4 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1.8^2 + 8^2 = 3.24 + 64 = 67.24$$

$$\text{ladder} = \sqrt{67.24} = 8.200... = 8.2\text{m}$$

✓5 cm

Q5 · ● Developing · 2 marks

METHOD

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

$$c^2 = 3^2 + 4^2 = 9 + 16 = 25$$

$$c = \sqrt{25} = 5\text{cm}$$

✓4.3 m

Q6 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1.5^2 + 4^2 = 2.25 + 16 = 18.25$$

$$\text{ladder} = \sqrt{18.25} = 4.272... = 4.3\text{m}$$

✓4.7 m

Q7 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 2.5^2 + 4^2 = 6.25 + 16 = 22.25$$

$$\text{ladder} = \sqrt{22.25} = 4.717... = 4.7\text{m}$$

✓5.6 m

Q8 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1.2^2 + 5.5^2 = 1.44 + 30.25 = 31.69$$

$$\text{ladder} = \sqrt{31.69} = 5.629... = 5.6\text{m}$$

✓4.6 m

Q9 · ● Developing · 2 marks

METHOD

$$\text{ladder}^2 = 1^2 + 4.5^2 = 1 + 20.25 = 21.25$$

$$\text{ladder} = \sqrt{21.25} = 4.610... = 4.6\text{m}$$

✓5 m

Q10 · ● Developing · 2 marks

METHOD

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

$$c^2 = 4^2 + 3^2 = 16 + 9 = 25$$

$$c = \sqrt{25} = 5\text{m}$$

✓16 cm

Q11 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 34^2 - 30^2 = 1156 - 900 = 256$$

$$b = \sqrt{256} = 16\text{cm}$$

✓10 cm

Q12 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 26^2 - 24^2 = 676 - 576 = 100$$

$$b = \sqrt{100} = 10\text{cm}$$

✓4 cm

Q13 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 5^2 - 3^2 = 25 - 9 = 16$$

$$b = \sqrt{16} = 4\text{cm}$$

✓20.8 cm

Q14 · ● Secure · 3 marks

METHOD

$$\tan(60^\circ) = \text{opposite/adjacent}$$

$$\text{opposite} = 12 \times \tan(60^\circ) = 20.8\text{cm}$$

✓12 m

Q15 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 37^2 - 35^2 = 1369 - 1225 = 144$$

$$b = \sqrt{144} = 12\text{m}$$

✓3 cm

Q16 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 5^2 - 4^2 = 25 - 16 = 9$$

$$b = \sqrt{9} = 3\text{cm}$$

✓19.2 m

Q17 · ● Secure · 3 marks

METHOD

$$\tan(70^\circ) = \text{opposite/adjacent}$$

$$\text{opposite} = 7 \times \tan(70^\circ) = 19.2\text{m}$$

✓8 m

Q18 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 17^2 - 15^2 = 289 - 225 = 64$$

$$b = \sqrt{64} = 8\text{m}$$

✓27.9 m

Q19 · ● Secure · 3 marks

METHOD

$$\tan(65^\circ) = \text{opposite/adjacent}$$

$$\text{opposite} = 13 \times \tan(65^\circ) = 27.9\text{m}$$

✓5 cm

Q20 · ● Secure · 3 marks

METHOD

$$b^2 = c^2 - a^2$$

$$b^2 = 13^2 - 12^2 = 169 - 144 = 25$$

$$b = \sqrt{25} = 5\text{cm}$$

✓ 67.4°

Q21 · ● Greater Depth · 3 marks

METHOD

$$\cos(\theta) = \text{adjacent/hypotenuse} = 5/13$$
$$\theta = \cos^{-1}(5/13) = 67.4^\circ$$

✓ 53.1°

Q22 · ● Greater Depth · 3 marks

METHOD

$$\sin(\theta) = \text{opposite/hypotenuse} = 8/10$$
$$\theta = \sin^{-1}(8/10) = 53.1^\circ$$

✓ 7.6 m

Q23 · ● Greater Depth · 4 marks

METHOD

$$\tan(70^\circ) = \text{height/distance}$$
$$\text{distance} = 21 \div \tan(70^\circ) = 7.6\text{m}$$

✓ 8.4 m

Q24 · ● Greater Depth · 4 marks

METHOD

$$\tan(50^\circ) = \text{height/distance}$$
$$\text{distance} = 10 \div \tan(50^\circ) = 8.4\text{m}$$

✓ 46.4°

Q25 · ● Greater Depth · 3 marks

METHOD

$$\sin(\theta) = \text{opposite/hypotenuse} = 21/29$$
$$\theta = \sin^{-1}(21/29) = 46.4^\circ$$

✓71.1°

Q26 · ● Greater Depth · 3 marks

METHOD

$$\tan(\theta) = \text{opposite/adjacent} = 35/12$$

$$\theta = \tan^{-1}(35/12) = 71.1^\circ$$

✓22.6°

Q27 · ● Greater Depth · 3 marks

METHOD

$$\tan(\theta) = \text{opposite/adjacent} = 10/24$$

$$\theta = \tan^{-1}(10/24) = 22.6^\circ$$

✓28.1°

Q28 · ● Greater Depth · 3 marks

METHOD

$$\cos(\theta) = \text{adjacent/hypotenuse} = 15/17$$

$$\theta = \cos^{-1}(15/17) = 28.1^\circ$$

✓15.6 m

Q29 · ● Greater Depth · 4 marks

METHOD

$$\tan(30^\circ) = \text{height/distance}$$

$$\text{distance} = 9 \div \tan(30^\circ) = 15.6\text{m}$$

✓61.9°

Q30 · ● Greater Depth · 3 marks

METHOD

$$\tan(\theta) = \text{opposite/adjacent} = 15/8$$

$$\theta = \tan^{-1}(15/8) = 61.9^\circ$$