
GCSE Mathematics

3D Trigonometry & Pythagoras

Mark Scheme - Higher Tier | Grades 8-9

M = method mark, A = accuracy mark (dependent on the preceding M mark), B = independent mark.

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Edexcel-style questions

Q1 Grade 8 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$AG^2 = 6^2 + 4^2 + 3^2$	M1
(a)	$AG^2 = 36 + 16 + 9 = 61$	M1
(a)	$AG = 7.81 \text{ cm (3 s.f.)}$	A1

Q2 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$AC^2 = 8^2 + 6^2 = 100$	M1
(a)	$AC = 10 \text{ cm}$	A1
(a)	$\tan(\text{angle GAC}) = 5 / 10$	M1
(a)	$\text{angle GAC} = 26.6^\circ \text{ (1 d.p.)}$	A1

Q3 Grade 8 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 6^2 + 6^2 = 72$, so $AM^2 = 72 \div 4 = 18$	M1
(a)	$VM^2 = 9^2 - 18 = 63$	M1
(a)	$VM = 7.94 \text{ cm (3 s.f.)}$	A1

Q4 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 10^2 + 10^2 = 200$, so $AM^2 = 200 \div 4 = 50$	M1
(a)	$AM = 7.07 \text{ cm (3 s.f.)}$	A1
(a)	$\tan(\text{angle VAM}) = 12 / 7.07$	M1
(a)	$\text{angle VAM} = 59.5^\circ \text{ (1 d.p.)}$	A1

Q5 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$\text{base diagonal}^2 = 12^2 + 5^2 = 169$	M1
(a)	$\text{base diagonal} = 13 \text{ m}$	A1
(a)	$\tan(\text{angle}) = 8 / 13$	M1
(a)	$\text{angle} = 31.6^\circ \text{ (1 d.p.)}$	A1

AQA-style questions

Q6 Grade 8 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$AG^2 = 8^2 + 5^2 + 4^2$	M1
(a)	$AG^2 = 64 + 25 + 16 = 105$	M1
(a)	$AG = 10.2 \text{ cm (3 s.f.)}$	A1

Q7 Grade 9 AQA style**Total: 4**

Part	Mark scheme	Marks
(a)	$AC^2 = 12^2 + 5^2 = 169$	M1
(a)	$AC = 13 \text{ cm}$	A1
(a)	$\tan(\text{angle GAC}) = 4 / 13$	M1
(a)	$\text{angle GAC} = 17.1^\circ \text{ (1 d.p.)}$	A1

Q8 Grade 8 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 10^2 + 10^2 = 200$, so $AM^2 = 200 \div 4 = 50$	M1
(a)	$VM^2 = 13^2 - 50 = 119$	M1
(a)	$VM = 10.9 \text{ cm (3 s.f.)}$	A1

Q9 Grade 9 AQA style**Total: 4**

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 8^2 + 8^2 = 128$, so $AM^2 = 128 \div 4 = 32$	M1
(a)	$AM = 5.66 \text{ cm (3 s.f.)}$	A1
(a)	$\tan(\text{angle VAM}) = 9 / 5.66$	M1
(a)	$\text{angle VAM} = 57.8^\circ \text{ (1 d.p.)}$	A1

Q10 Grade 9 AQA style**Total: 4**

Part	Mark scheme	Marks
(a)	$\text{base diagonal}^2 = 9^2 + 12^2 = 225$	M1
(a)	$\text{base diagonal} = 15 \text{ m}$	A1
(a)	$\tan(\text{angle}) = 4 / 15$	M1
(a)	$\text{angle} = 14.9^\circ \text{ (1 d.p.)}$	A1

OCR-style questions

Q11 Grade 8 OCR style**Total: 3**

Part	Mark scheme	Marks
(a)	$AG^2 = 9^2 + 6^2 + 2^2$	M1
(a)	$AG^2 = 81 + 36 + 4 = 121$	M1
(a)	$AG = 11 \text{ cm}$	A1

Q12 Grade 9 OCR style**Total: 4**

Part	Mark scheme	Marks
(a)	$AC^2 = 9^2 + 12^2 = 225$	M1
(a)	$AC = 15 \text{ cm}$	A1
(a)	$\tan(\text{angle GAC}) = 8 / 15$	M1
(a)	$\text{angle GAC} = 28.1^\circ \text{ (1 d.p.)}$	A1

Q13 Grade 8 OCR style**Total: 3**

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 8^2 + 8^2 = 128$, so $AM^2 = 128 \div 4 = 32$	M1
(a)	$VM^2 = 12^2 - 32 = 112$	M1
(a)	$VM = 10.6 \text{ cm (3 s.f.)}$	A1

Q14 Grade 9 OCR style**Total: 4**

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 14^2 + 14^2 = 392$, so $AM^2 = 392 \div 4 = 98$	M1
(a)	$AM = 9.90 \text{ cm (3 s.f.)}$	A1
(a)	$\tan(\text{angle VAM}) = 10 / 9.90$	M1
(a)	$\text{angle VAM} = 45.3^\circ \text{ (1 d.p.)}$	A1

Q15 Grade 9 OCR style**Total: 4**

Part	Mark scheme	Marks
(a)	$\text{base diagonal}^2 = 15^2 + 8^2 = 289$	M1
(a)	$\text{base diagonal} = 17 \text{ m}$	A1
(a)	$\tan(\text{angle}) = 6 / 17$	M1
(a)	$\text{angle} = 19.4^\circ \text{ (1 d.p.)}$	A1

Teachably-style questions

Q16 Grade 8 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$AG^2 = 10^2 + 4^2 + 3^2$	M1
(a)	$AG^2 = 100 + 16 + 9 = 125$	M1
(a)	$AG = 11.2 \text{ cm (3 s.f.)}$	A1

Q17 Grade 9 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$AC^2 = 7^2 + 24^2 = 625$	M1
(a)	$AC = 25 \text{ cm}$	A1
(a)	$\tan(\text{angle GAC}) = 10 / 25$	M1
(a)	$\text{angle GAC} = 21.8^\circ \text{ (1 d.p.)}$	A1

Q18 Grade 8 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 12^2 + 12^2 = 288$, so $AM^2 = 288 \div 4 = 72$	M1
(a)	$VM^2 = 15^2 - 72 = 153$	M1
(a)	$VM = 12.4 \text{ cm (3 s.f.)}$	A1

Q19 Grade 9 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$\text{diagonal}^2 = 6^2 + 6^2 = 72$, so $AM^2 = 72 \div 4 = 18$	M1
(a)	$AM = 4.24 \text{ cm (3 s.f.)}$	A1
(a)	$\tan(\text{angle VAM}) = 8 / 4.24$	M1
(a)	$\text{angle VAM} = 62.1^\circ \text{ (1 d.p.)}$	A1

Q20 Grade 9 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$\text{base diagonal}^2 = 21^2 + 20^2 = 841$	M1
(a)	$\text{base diagonal} = 29 \text{ m}$	A1
(a)	$\tan(\text{angle}) = 10 / 29$	M1
(a)	$\text{angle} = 19.0^\circ \text{ (1 d.p.)}$	A1

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