
GCSE Mathematics

Trigonometric Equations

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: 2

Part	Mark scheme	Marks
(a)	$x = \sin^{-1}(0.6)$	M1
(a)	$x = 36.9^\circ$ (1 d.p.)	A1

Q2 Grade 9 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$x = \cos^{-1}(0.35) = 69.5^\circ$	M1
(a)	$x = 360^\circ - 69.5^\circ$	M1
(a)	$x = 69.5^\circ$ or $x = 290.5^\circ$	A1

Q3 Grade 9 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$\tan^{-1}(1.4) = 54.5^\circ$	M1
(a)	$x = 180^\circ - 54.5^\circ$ and $x = 360^\circ - 54.5^\circ$	M1
(a)	$x = 125.5^\circ$ or $x = 305.5^\circ$	A1

Q4 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$\sin x^\circ = 1.4 \div 2 = 0.7$	M1
(a)	$\sin^{-1}(0.7) = 44.4^\circ$	M1
(a)	$x = 180^\circ - 44.4^\circ$	M1
(a)	$x = 44.4^\circ$ or $x = 135.6^\circ$	A1

Q5 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$3 \cos x^\circ = 8 - 6 = 2$	M1
(a)	$\cos x^\circ = 2 \div 3 = 0.667$	A1
(a)	$x = \cos^{-1}(0.667)$	M1
(a)	$x = 48.2^\circ$ (1 d.p.)	A1

AQA-style questions

Q6 Grade 8 AQA style**Total: 2**

Part	Mark scheme	Marks
(a)	$x = \cos^{-1}(0.45)$	M1
(a)	$x = 63.3^\circ$ (1 d.p.)	A1

Q7 Grade 9 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$x = \tan^{-1}(1.8) = 60.9^\circ$	M1
(a)	$x = 180^\circ + 60.9^\circ$	M1
(a)	$x = 60.9^\circ$ or $x = 240.9^\circ$	A1

Q8 Grade 9 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$\sin^{-1}(0.4) = 23.6^\circ$	M1
(a)	$x = 180^\circ + 23.6^\circ$ and $x = 360^\circ - 23.6^\circ$	M1
(a)	$x = 203.6^\circ$ or $x = 336.4^\circ$	A1

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

Part	Mark scheme	Marks
(a)	$\cos x^\circ = 1.6 \div 4 = 0.4$	M1
(a)	$\cos^{-1}(0.4) = 66.4^\circ$	M1
(a)	$x = 360^\circ - 66.4^\circ$	M1
(a)	$x = 66.4^\circ$ or $x = 293.6^\circ$	A1

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

Part	Mark scheme	Marks
(a)	$18 \sin x^\circ = 30 - 20 = 10$	M1
(a)	$\sin x^\circ = 10 \div 18 = 0.556$	A1
(a)	$x = \sin^{-1}(0.556)$	M1
(a)	$x = 33.7^\circ$ (1 d.p.)	A1

OCR-style questions

Q11 Grade 8 OCR style**Total: 2**

Part	Mark scheme	Marks
(a)	$x = \tan^{-1}(2.1)$	M1
(a)	$x = 64.5^\circ$ (1 d.p.)	A1

Q12 Grade 9 OCR style**Total: 3**

Part	Mark scheme	Marks
(a)	$x = \sin^{-1}(0.75) = 48.6^\circ$	M1
(a)	$x = 180^\circ - 48.6^\circ$	M1
(a)	$x = 48.6^\circ$ or $x = 131.4^\circ$	A1

Q13 Grade 9 OCR style**Total: 3**

Part	Mark scheme	Marks
(a)	$\cos^{-1}(0.42) = 65.2^\circ$	M1
(a)	$x = 180^\circ - 65.2^\circ$ and $x = 180^\circ + 65.2^\circ$	M1
(a)	$x = 114.8^\circ$ or $x = 245.2^\circ$	A1

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

Part	Mark scheme	Marks
(a)	$\tan x^\circ = 6.6 \div 3 = 2.2$	M1
(a)	$\tan^{-1}(2.2) = 65.6^\circ$	M1
(a)	$x = 180^\circ + 65.6^\circ$	M1
(a)	$x = 65.6^\circ$ or $x = 245.6^\circ$	A1

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

Part	Mark scheme	Marks
(a)	$8 \cos x^\circ = 20 - 15 = 5$	M1
(a)	$\cos x^\circ = 5 \div 8 = 0.625$	A1
(a)	$x = \cos^{-1}(0.625)$	M1
(a)	$x = 51.3^\circ$ (1 d.p.)	A1

Teachably-style questions

Q16 Grade 8 Teachably style

Total: 2

Part	Mark scheme	Marks
(a)	$x = \sin^{-1}(0.85)$	M1
(a)	$x = 58.2^\circ$ (1 d.p.)	A1

Q17 Grade 9 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$x = \cos^{-1}(0.55) = 56.6^\circ$	M1
(a)	$x = 360^\circ - 56.6^\circ$	M1
(a)	$x = 56.6^\circ$ or $x = 303.4^\circ$	A1

Q18 Grade 9 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$\tan^{-1}(2.5) = 68.2^\circ$	M1
(a)	$x = 180^\circ - 68.2^\circ$ and $x = 360^\circ - 68.2^\circ$	M1
(a)	$x = 111.8^\circ$ or $x = 291.8^\circ$	A1

Q19 Grade 9 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$\tan x^\circ = -9.2 \div 4 = -2.3$	M1
(a)	$\tan^{-1}(2.3) = 66.5^\circ$	M1
(a)	$x = 180^\circ - 66.5^\circ$ and $x = 360^\circ - 66.5^\circ$	M1
(a)	$x = 113.5^\circ$ or $x = 293.5^\circ$	A1

Q20 Grade 9 Teachably style

Total: 4

Part	Mark scheme	Marks
(a)	$2.5 \sin x^\circ = 6.8 - 5 = 1.8$	M1
(a)	$\sin x^\circ = 1.8 \div 2.5 = 0.72$	A1
(a)	$x = \sin^{-1}(0.72)$	M1
(a)	$x = 46.1^\circ$ (1 d.p.)	A1

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