Oxford Revise | Edexcel A Level Maths | Answers

- Method (**M**) marks are awarded for showing you know a method and have attempted to apply it.
- Accuracy (**A**) marks should only be awarded if the relevant M marks have been awarded.
- Unconditional accuracy (**B**) marks are awarded independently of M marks. They do not rely on method.
- The abbreviation **o.e.** means 'or equivalent (and appropriate)'.

Please note that:

- efficient use of advanced calculators is expected
- inexact numerical answers should be given to three significant figures unless the question states otherwise; values from statistical tables should be quoted in full
- when a value of g is required, it is taken as g = 9.8 m s^{-2} unless stated otherwise in the question.

Chapter 13 Trigonometric ratios

Question	Answer	Extra information	Marks
13.1 (a)	$\frac{1}{2} \times 14 \times 12 \times \frac{\sqrt{3}}{2} = 42\sqrt{3}$ (cm^2)	Use of area of a triangle formula Correct solution	M1 A1
13.1 (b)	$AC^2 = 14^2 + 12^2 - 2 \times 14 \times 12 \times \cos\left(\frac{\pi}{3}\right)$ $AC^2 = 340 - 168 = 172$ Hence $AC = 2\sqrt{43}$ (cm)	Use of cosine rule Value of AC^2 Correct solution. Must be exact.	M1 A1 A1
	Total		**5 marks**

Question	Answer	Extra information	Marks
13.2 (a)	$QS^2 = 250^2 + 190^2 - 2 \times 250 \times 190 \times \cos 47°$	Use of cosine rule	M1
	$QS^2 = 33810.15\ldots$	Value of QS^2	A1
	Hence $QS = 183.87\ldots = 184$ (m) (3 s.f.)	Correct solution. Must be to at least 3 s.f.	A1
13.2 (b)	$\dfrac{QR}{\sin 39°} = \dfrac{210}{\sin 51°}$	Use of sine rule	M1
	$\Rightarrow QR = 170.05\ldots = 170$ (m) (3 s.f.)	Correct solution. Must be to at least 3 s.f.	A1
13.2 (c)	$\dfrac{1}{2} \times 190 \times 250 \times \sin 47°$	Finding either triangle area	M1
	$+ \dfrac{1}{2} \times '184' \times '170' \times \sin 51°$	Adding areas	M1
	$= 17\,369.65041\ldots + 12\,154.56284\ldots$	Either area correct. Value of second area will vary depending whether exact or rounded answers to (a) and (b) are used.	A1
	$= 29\,524.21\ldots$		
	$= 29\,500$ (m^2) (to 3.s.f)	Correct area	A1
	Total		**9 marks**
13.3 (a)	$50 = 1.8x \Rightarrow x = \dfrac{250}{9}$	Attempting to find x	M1
	Area $= \dfrac{1}{2}\left(\dfrac{250}{9}\right)^2 \times 1.8$	Use of area formula with their x	M1
	$= \dfrac{6250}{9}$ (cm^2)	Correct answer	A1

Question	Answer	Extra information	Marks
13.3 (b)	$AB^2 = \left(`\dfrac{250}{9}`\right)^2 + \left(`\dfrac{250}{9}`\right)^2 - 2\times`\dfrac{250}{9}`\times`\dfrac{250}{9}`\times\cos 1.8$	Use of cosine rule	M1
	$= 1893.83\ldots$ Hence $AB = 43.518 = 43.5$ (3 s.f.)	Correct AB	A1
	$+ 50$ $= 93.5$ (cm) (3 s.f.)	Correct solution to correct degree of accuracy	A1
	Total		**6 marks**
13.4 (a)	$\cos AOB = \dfrac{14.7^2 + 14.7^2 - 23.3^2}{2\times 14.7\times 14.7}$	Use of cosine rule	M1
	$= -0.2561\ldots$ Angle $AOB = \cos^{-1}(`-0.2561\ldots`)$	Inverse cosine of their value	M1
	$= 104.8°$ (1 d.p.)	Correct angle	A1
13.4 (b)	Area of major sector $= \dfrac{360 - `104.8`}{360}\times\pi\times 14.7^2$	Use of area of sector	M1
	$= 481.16\ldots$	Correct sector area	A1
	Area of triangle $AOB = \dfrac{1}{2}\times 14.7^2\times\sin 104.8°$	Use of area of triangle	M1
	$= 104.46\ldots$	Correct triangle area	A1
	Total area $= 481.16\ldots + 104.46\ldots$		
	$= 586$ (m^2) (3 s.f.)	Correct cross-section area	A1

Question	Answer	Extra information	Marks
13.4 (c)	586×12 $\times\ 1.2 \times 110 = \pounds 927\,622.77 = \pounds 928\,000$	One correct step Complete correct method	M1 M1A1
	Total		**11 marks**
13.5	$\cos 4x = 1 - \dfrac{(4x)^2}{2} = 1 - 8x^2$ $\dfrac{1 - 8x^2 - 1}{x \times 5x} = -\dfrac{8}{5}$	One correct approximation Two correct approximations to reach expression in x only Correct answer	M1 M1 A1
	Total		**3 marks**
13.6	$\cos 3x = 1 - \dfrac{(3x)^2}{2} = 1 - \dfrac{9}{2}x^2$ $\dfrac{1 - \left(1 - \dfrac{9}{2}x^2\right)}{2x \times 6x} = \dfrac{3}{8}$	One correct approximation Two correct approximations to reach expression in x only Correct answer	M1 M1 A1
	Total		**3 marks**
13.7 (a)	$\tan 4x \cos 3x = 4x\left(1 - \dfrac{(3x)^2}{2}\right)$ $= 4x - 18x^3$	One correct approximation Two correct approximations to reach expression in x only Correct answer	M1 A1 A1

Question	Answer	Extra information	Marks
13.7 (b)	$x = 0.05$	Identifying value for x	B1
	Percentage error $= \dfrac{0.20043... - 0.19775}{0.20043...} \times 100$	Use of percentage error formula	M1
	$= 1.34\%$ (3 s.f.)	Correct percentage	A1
	Total		**6 marks**
13.8 (a)	$u_2 = 7k - 3$	Correct u_2	B1
	$u_3 = k(7k - 3) - 3$	Substituting their u_2	M1
	$= 7k^2 - 3k - 3$	Correct expression	A1
13.8 (b)	'$7k^2 - 3k - 3$' $= 97$	Setting their expression from (a) $= 97$	M1
	$7k^2 - 3k - 100 = 0$	All three terms correct in quadratic	A1
	$\Rightarrow k = 4$ or $k = -\dfrac{25}{7}$	Correct values of k	A1
	Total		**6 marks**
13.9 (a)	$500 + 8 \times 150 = 1700$ (m)	Use of correct formula	M1
		Correct distance	A1
13.9 (b)	$\dfrac{20}{2}\left[1000 + (20 - 1) \times 150\right]$	Use of correct formula	M1
	$= 38\,500$ (m)	Correct answer	A1
13.9 (c)	No. $500 + 19 \times 150 = 3350$ m, or 3.35 km, is the furthest that Tiye has run.	Correct explanation	B1
	Total		**5 marks**