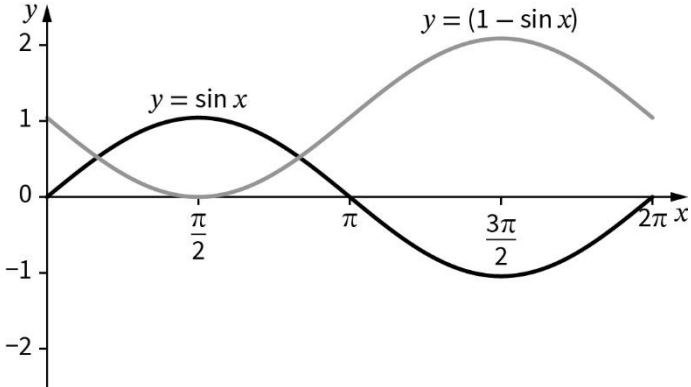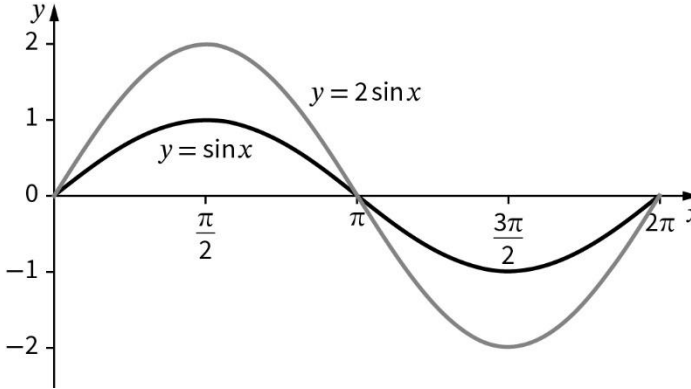# Oxford Revise | Edexcel A Level Maths | Answers

- 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.
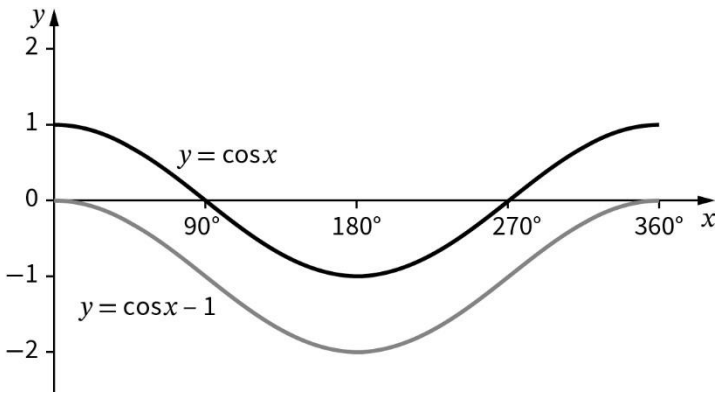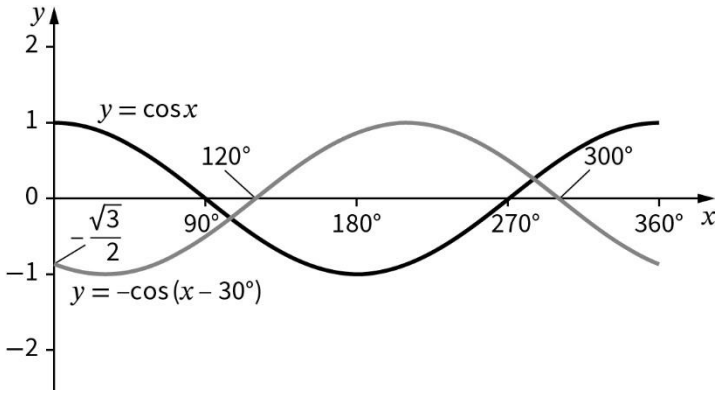- The abbreviation **o.e.** means 'or equivalent (and appropriate)'.
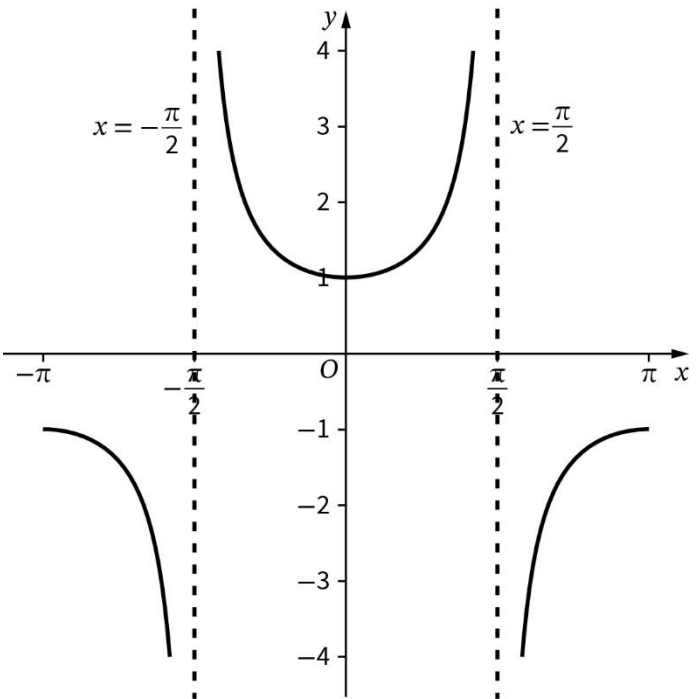
Please note that:

- 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.
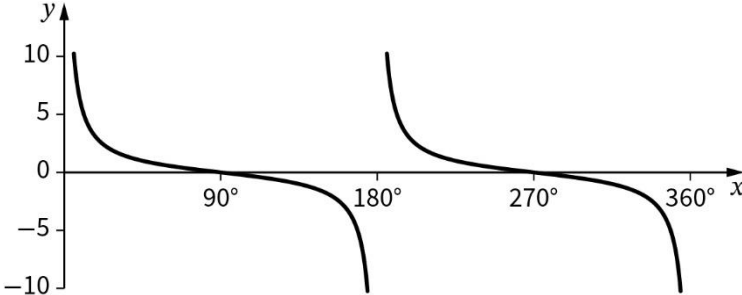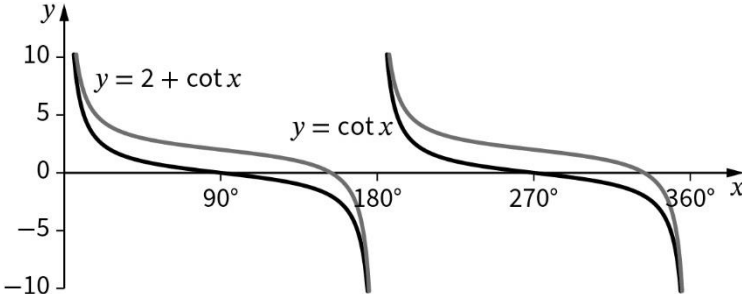
Chapter 14 Trigonometric functions
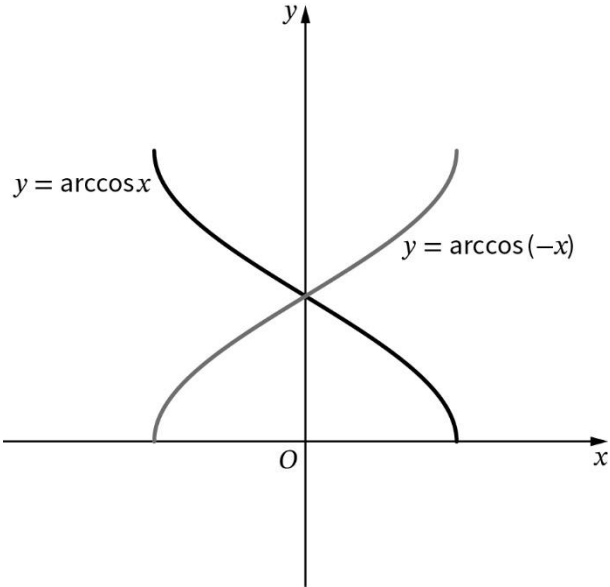
Question	Answer	Extra information	Marks
14.1 (a)		Correct shape	B1
		Key points $\left(0, -\dfrac{1}{2}\right)$, $\left(\dfrac{\pi}{6}, 0\right)$ and $\left(\dfrac{7\pi}{6}, 0\right)$ indicated. Accept axes labelled with values.	B1
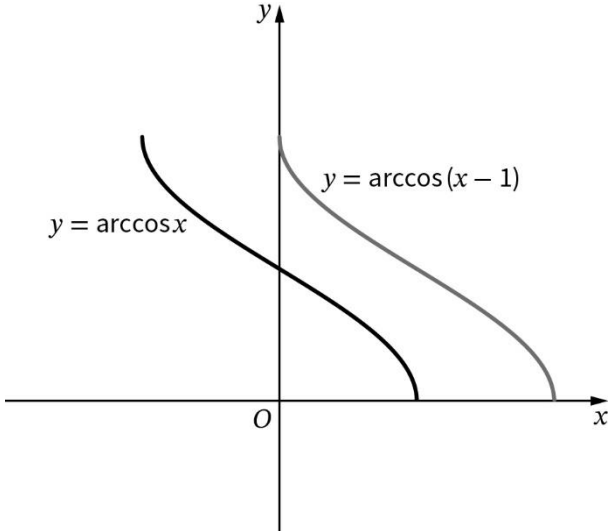
Question	Answer	Extra information	Marks
14.1 (b)		Correct shape Key points $(0, 1)$ and $\left(\dfrac{\pi}{2}, 0\right)$ need to be indicated. Accept axes labelled with values.	B1 B1
14.1 (c)		Correct shape Key points $(0, 0)$, $(\pi, 0)$ and $(2\pi, 0)$ need to be indicated. Accept axes labelled with values.	B1 B1
	Total		**6 marks**

Question	Answer	Extra information	Marks
14.2 (a)		Correct shape Key points (0°, 0) and (360°, 0) need to be indicated. Accept axes labelled with values.	B1 B1
14.2 (b)		Correct shape Key points $\left(0°, -\dfrac{\sqrt{3}}{2}\right)$, (120°, 0) and (300°, 0) need to be indicated. Accept axes labelled with values.	B1 B1
14.2 (c)	2	Correct answer	B1
	Total		**5 marks**

Question	Answer	Extra information	Marks
14.3 (a)		Correct shape Correctly labelled asymptotes and min/max points	B1 B1
14.3 (b)	$\lvert y \rvert \geq 1$	Accept $\lvert \sec x \rvert \geq 1$ or $f(x) \geq 1$ but **not** $\lvert x \rvert \geq 1$	B1
14.3 (c)	Because the period of the function is 2π	Correct reason	B1
	Total		**4 marks**

Question	Answer	Extra information	Marks
14.4 (a)		Correct shape Correctly labelled asymptotes and intersections	B1 B1
14.4 (b)		Clear vertical translation Completely correct graph	B1 B1
14.4 (c)	The transformation is a translation in the y-direction so the asymptotes do not move.	Correct answer	B1
	Total		**5 marks**
14.5 (a)	$\left(\dfrac{\pi}{2}, 1\right)$	Correct values	B1
14.5 (b)	$\left(\dfrac{\pi}{6}, 2\right)$	One mark for each value	B1B1

Question	Answer	Extra information	Marks
	Total		**3 marks**
14.6 (a)	$A(-1, \pi)$ $B\left(0, \dfrac{\pi}{2}\right)$ $C(1, 0)$	Correct answers only	B1 B1 B1
14.6 (b)(i)		Correct graph	B1

Question	Answer	Extra information	Marks
14.6 (b)(ii)		Correct graph	B1
	Total		**5 marks**
14.7 (a)	2.05 m	Correct answer	B1
14.7 (b)	$2 + 0.05\cos(20 \times 0.1)$ $= 1.98$ metres	Correct substitution Correct answer	M1 A1
14.7 (c)	1.95 metres Occurs when $\cos(20t) = -1$ $20t = \pi$ $\Rightarrow t = 0.157$ seconds	Correct minimum Correct equation Correct value of t	B1 M1 A1

Question	Answer	Extra information	Marks
14.7 (d)	$0.05 \cos(20t) = 0.01$	Correct equation	M1
	Hence $\cos(20t) = 0.2$	Attempting to solve	M1
	$20t = 1.369, 4.914, 7.652, 11.197$		
	$t = 0.07, 0.25, 0.38, 0.56$ (seconds)	One correct value	A1
		All correct values	A1
	Total		**10 marks**
14.8	$a = \dfrac{4}{9}, r = -\dfrac{2}{3}$	Identifying a and r	B1
	$S_\infty = \dfrac{\dfrac{4}{9}}{1 - \left(-\dfrac{2}{3}\right)} = \dfrac{\dfrac{4}{9}}{\dfrac{5}{3}}$	Use of sum to infinity	M1
	$= \dfrac{4}{9} \times \dfrac{3}{5}$		
	$= \dfrac{4}{15}$	Correct value	A1
	Total		**3 marks**
14.9 (a)	They have used degrees rather than radians.	Correct reason	B1
14.9 (b)	arc $AB = \dfrac{86\pi}{180} \times 7.3$	Correct formula	M1
	$= 10.96$ (cm)	Correct area	A1

Question	Answer	Extra information	Marks
14.9 (c)	$\dfrac{1}{2} \times 7.3^2 \times \dfrac{86\pi}{180}$ $= 39.9936 \text{ cm}^2$ $= 40.0 \text{ cm}^2$ (3 s.f.)	Correct formula Correct area	M1 A1
14.9 (d)	Area of triangle: $\dfrac{1}{2} \times 7.3^2 \times \sin\left(\dfrac{86\pi}{180}\right) = 26.5800...$ Area of segment = '39.9936' – '26.5800…' = 13.4136… $= 13.4 \text{ cm}^2$ (3 s.f.)	Area of triangle Subtracting from their (b) Correct area	M1 M1 A1
	Total		**8 marks**
14.10	$\cos 5\theta = 1 - \dfrac{(5\theta)^2}{2} = 1 - \dfrac{25}{2}\theta^2$ $\dfrac{1 - \left(1 - \dfrac{25}{2}\theta^2\right)}{3\theta \times 7\theta}$ $= \dfrac{25}{42}$	One correct substitution Correct expression in θ only Correct value	M1 M1 A1
	Total		**3 marks**