

Core 2 Transformations Questions

- 6 (a) Describe the geometrical transformation that maps the curve with equation $y = \sin x$ onto the curve with equation:
- (i) $y = 2 \sin x$; (2 marks)
 - (ii) $y = -\sin x$; (2 marks)
 - (iii) $y = \sin(x - 30^\circ)$. (2 marks)
- (b) Solve the equation $\sin(\theta - 30^\circ) = 0.7$, giving your answers to the nearest 0.1° in the interval $0^\circ \leq \theta \leq 360^\circ$. (3 marks)
- (c) Prove that $(\cos x + \sin x)^2 + (\cos x - \sin x)^2 = 2$. (4 marks)
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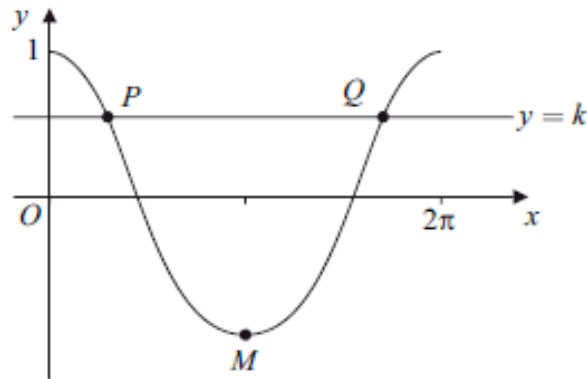
- 8 (a) Describe the single geometrical transformation by which the curve with equation $y = \tan \frac{1}{2}x$ can be obtained from the curve $y = \tan x$. (2 marks)
- (b) Solve the equation $\tan \frac{1}{2}x = 3$ in the interval $0 < x < 4\pi$, giving your answers in radians to three significant figures. (4 marks)
- (c) Solve the equation

$$\cos \theta (\sin \theta - 3 \cos \theta) = 0$$

in the interval $0 < \theta < 2\pi$, giving your answers in radians to three significant figures. (5 marks)

- 7 (a) Sketch the graph of $y = \tan x$ for $0^\circ \leq x \leq 360^\circ$. (3 marks)
- (b) Write down the **two** solutions of the equation $\tan x = \tan 61^\circ$ in the interval $0^\circ \leq x \leq 360^\circ$. (2 marks)
- (c) (i) Given that $\sin \theta + \cos \theta = 0$, show that $\tan \theta = -1$. (1 mark)
- (ii) Hence solve the equation $\sin(x - 20^\circ) + \cos(x - 20^\circ) = 0$ in the interval $0^\circ \leq x \leq 360^\circ$. (4 marks)
- (d) Describe the single geometrical transformation that maps the graph of $y = \tan x$ onto the graph of $y = \tan(x - 20^\circ)$. (2 marks)
- (e) The curve $y = \tan x$ is stretched in the x -direction with scale factor $\frac{1}{4}$ to give the curve with equation $y = f(x)$. Write down an expression for $f(x)$. (1 mark)

- 8 (a) Solve the equation $\cos x = 0.3$ in the interval $0 \leq x \leq 2\pi$, giving your answers in radians to three significant figures. (3 marks)
- (b) The diagram shows the graph of $y = \cos x$ for $0 \leq x \leq 2\pi$ and the line $y = k$.



The line $y = k$ intersects the curve $y = \cos x$, $0 \leq x \leq 2\pi$, at the points P and Q . The point M is the minimum point of the curve.

- (i) Write down the coordinates of the point M . (2 marks)
- (ii) The x -coordinate of P is α .

Write down the x -coordinate of Q in terms of π and α . (1 mark)

- (c) Describe the geometrical transformation that maps the graph of $y = \cos x$ onto the graph of $y = \cos 2x$. (2 marks)
- (d) Solve the equation $\cos 2x = \cos \frac{4\pi}{5}$ in the interval $0 \leq x \leq 2\pi$, giving the values of x in terms of π . (4 marks)