Sample Paper 2014: Paper 2

Question 5 (25 marks)

Question 5 (a)

$g : x \mapsto \sin x \Rightarrow P = 2\pi,\ R = [-1,\ 1]$

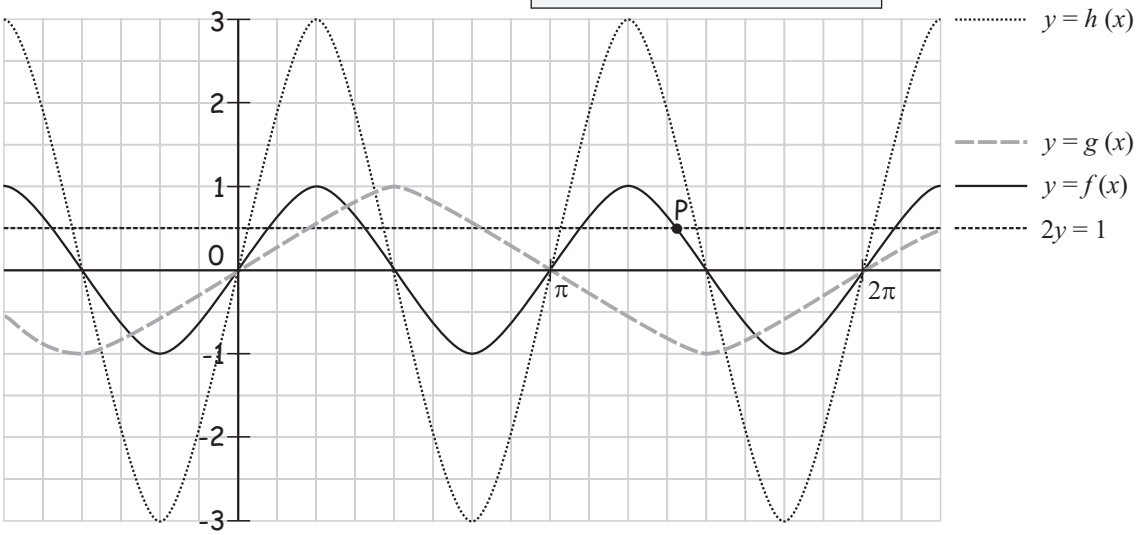
$h : x \mapsto 3\sin 2x \Rightarrow P = \dfrac{2\pi}{2} = \pi,\ R = [-3,\ 3]$

Period P and Range R

$y = a\sin bx$

Range $R = [-a,\ a]$

Period $P = \dfrac{2\pi}{b}$



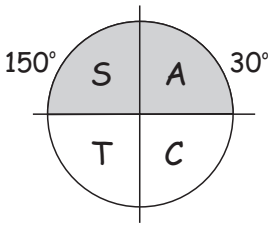
Question 5 (b)

$y = f(x) = \sin 2x$

$2y = 1 \Rightarrow y = \frac{1}{2}$

$\therefore \sin 2x = \frac{1}{2}$

$2x = \sin^{-1}(\frac{1}{2}) = 30^\circ = \dfrac{\pi}{6}$



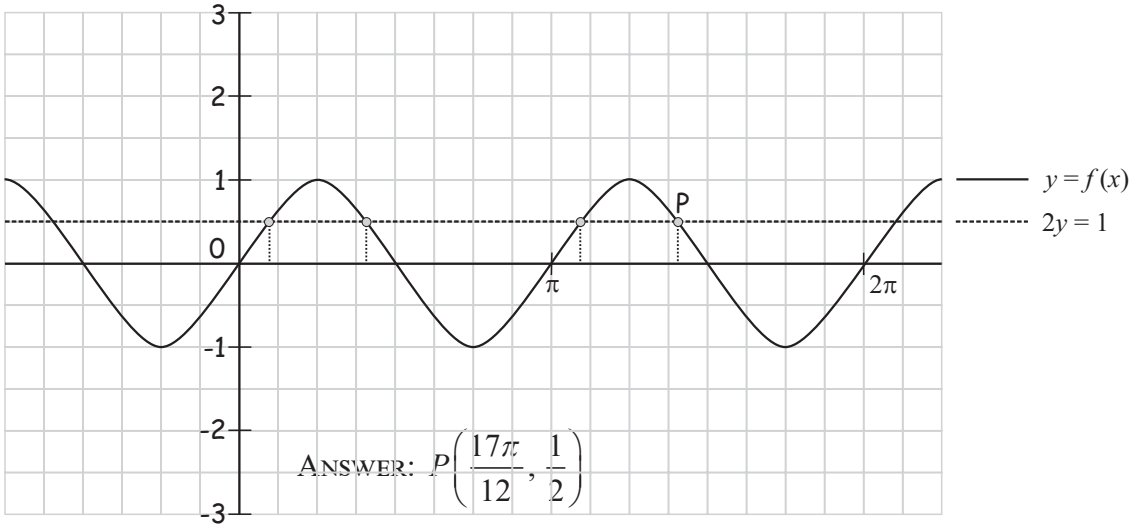
$2x = \dfrac{\pi}{6},\ \dfrac{13\pi}{6}$ [First quadrant]

$2x = \dfrac{5\pi}{6},\ \dfrac{17\pi}{6}$ [Second quadrant]

$x = \dfrac{\pi}{12},\ \dfrac{13\pi}{12}$

$x = \dfrac{5\pi}{12},\ \dfrac{17\pi}{12}$

$\therefore x = \dfrac{\pi}{12},\ \dfrac{5\pi}{12},\ \dfrac{13\pi}{12},\ \dfrac{17\pi}{12}$ [These are all the solutions between 0 and 2π.]



Answer: $P\left(\dfrac{17\pi}{12},\ \dfrac{1}{2}\right)$