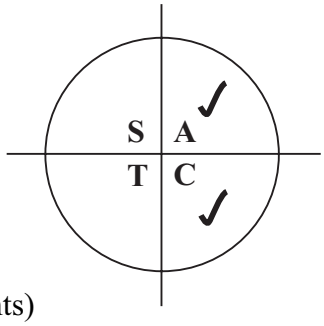
Sample Paper 7: Paper 2

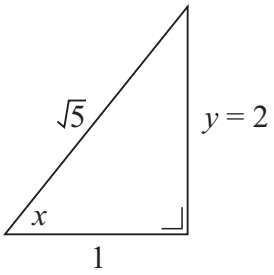
Question 3 (25 marks)

Question 3 (a)

$$\cos x = +\frac{1}{\sqrt{5}} = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$



The angle x is located in the first and fourth quadrants.



$\tan x = \pm 2$ (First and fourth quadrants)

$$\tan 2x = \frac{2\tan x}{1-\tan^2 x}$$

$$\tan x = 2 : \tan 2x = \frac{2(2)}{1-2^2} = -\frac{4}{3}$$

$$\tan x = -2 : \tan 2x = \frac{2(-2)}{1-(-2)^2} = \frac{4}{3}$$

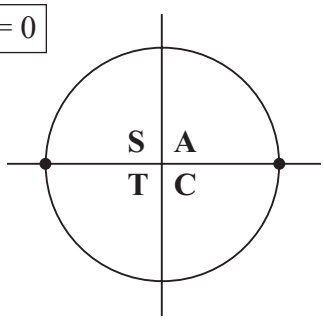
$$1^2 + y^2 = (\sqrt{5})^2$$

$$y^2 = 5 - 1 = 4$$

$$\therefore y = 2$$

Question 3 (b) (i)

$\sin 3x = 0$

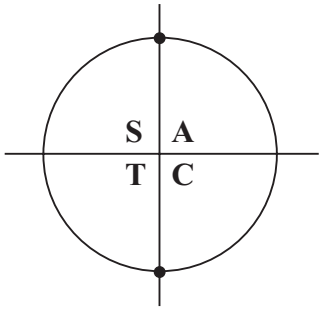


$$3x = 0 + 2n\pi,\ \pi + 2n\pi,\ n \in \mathbb{Z}$$

$$x = \frac{2n\pi}{3},\ \frac{\pi}{3} + \frac{2n\pi}{3},\ n \in \mathbb{Z}$$

$$x = 0,\ \frac{\pi}{3},\ \frac{2\pi}{3},\ \pi,\ \frac{4\pi}{3},\ \frac{5\pi}{3}$$

$\cos 2x = 0$



$$2x = \frac{\pi}{2} + 2n\pi,\ \frac{3\pi}{2} + 2n\pi,\ n \in \mathbb{Z}$$

$$x = \frac{\pi}{4} + n\pi,\ \frac{3\pi}{4} + n\pi,\ n \in \mathbb{Z}$$

$$x = \frac{\pi}{4},\ \frac{3\pi}{4},\ \frac{5\pi}{4},\ \frac{7\pi}{4}$$

Question 3 (b) (ii)

$y = \sin 3x \cos 2x$

$$x = 0,\ \frac{\pi}{4},\ \frac{\pi}{3},\ \frac{2\pi}{3},\ \frac{3\pi}{4},\ \pi,\ \frac{5\pi}{4},\ \frac{4\pi}{3},\ \frac{5\pi}{3},\ \frac{7\pi}{4}$$

$p = \frac{\pi}{3}$ (Third root)

$q = \pi$ (Sixth root)

$r = \frac{5\pi}{4}$ (Seventh root)