

- Express  $\tan^2 \beta - 3 \sin \beta \cos \beta$  in terms of  $\alpha$ .

[illegible]

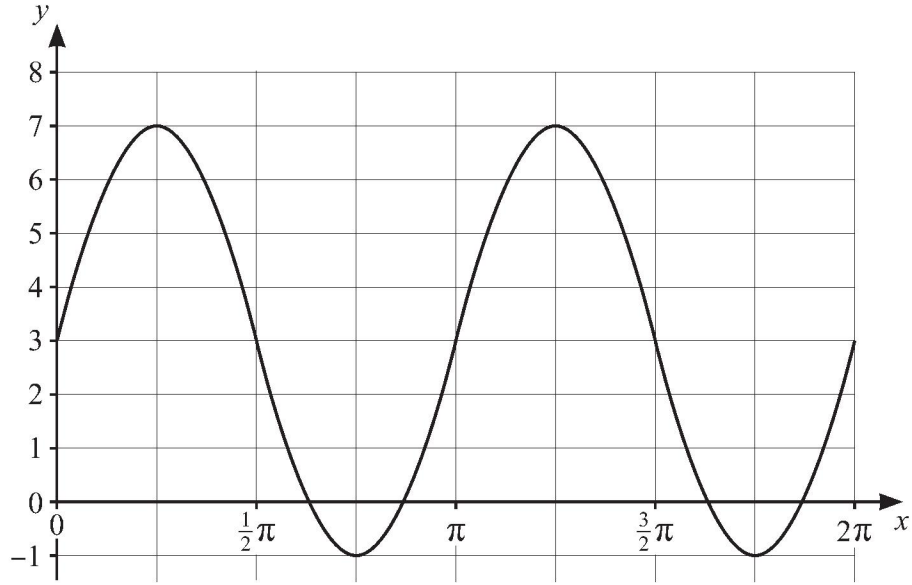


(b) Solve the equation  $\sin^2\theta + 2\cos^2\theta = 4\sin\theta + 3$  for  $0^\circ < \theta < 360^\circ$ . [5]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.



1



The diagram shows the curve with equation  $y = a \sin(bx) + c$  for  $0 \leq x \leq 2\pi$ , where  $a$ ,  $b$  and  $c$  are positive constants.

- (a) State the values of  $a$ ,  $b$  and  $c$ . [3]

.....

.....

.....

.....

.....

.....

.....

.....

- (b) For these values of  $a$ ,  $b$  and  $c$ , determine the number of solutions in the interval  $0 \leq x \leq 2\pi$  for each of the following equations:

- (i)  $a \sin(bx) + c = 7 - x$  [1]

.....

.....

- (ii)  $a \sin(bx) + c = 2\pi(x - 1)$ . [1]

.....

.....





DO NOT WRITE IN THIS MARGIN

$$\cos \frac{1}{6} \pi + \tan 2x + \frac{\sqrt{3}}{2} = 0 \text{ for } -\frac{1}{4} \pi < x < \frac{1}{4} \pi. \quad [2]$$

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.



[4]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.