

# radians

1. Solve  $2 \cos 2x - 5 \cos x - 4 = 0$  for  $0 \leq x < 2\pi$ .

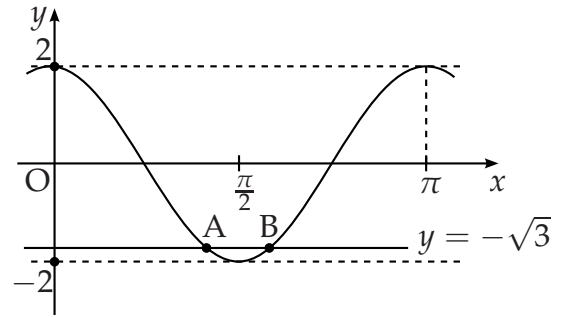
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[SQA] 2. The diagram shows the graph of a cosine function from  $0$  to  $\pi$ .

(a) State the equation of the graph.

(b) The line with equation  $y = -\sqrt{3}$  intersects this graph at point A and B.

Find the coordinates of B.



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[SQA] 3.

(a) Solve  $\cos 2x^\circ - 3 \cos x^\circ + 2 = 0$  for  $0 \leq x < 360$ .

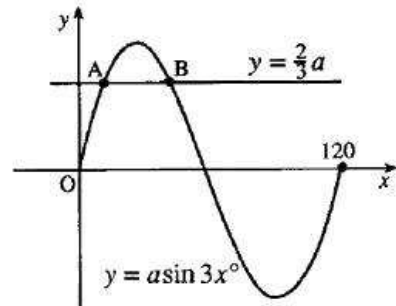
(b) Hence solve  $\cos 4x^\circ - 3 \cos 2x^\circ + 2 = 0$  for  $0 \leq x < 360$

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[SQA] 4. Find the values of  $t$ , where  $0 < t < 2\pi$ , for which  $4 \cos(2t - \frac{\pi}{4})$  has its maximum value.

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[SQA] 5. The diagram shows part of the graph of  $y = a \sin 3x^\circ$  and the line with equation  $y = \frac{2}{3}a$ . Find the  $x$ -coordinates of A and B.



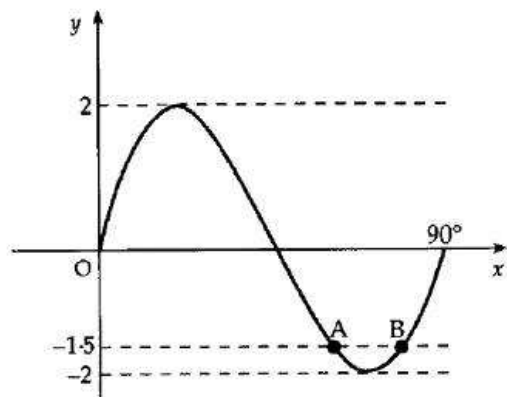
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[SQA] 6. The diagram shows the graph of a sine function from  $0^\circ$  to  $90^\circ$ .

(a) State the equation of the graph.

(b) The line with equation  $y = -1.5$  intersects the curve at A and B.

Find the coordinates of A and B.



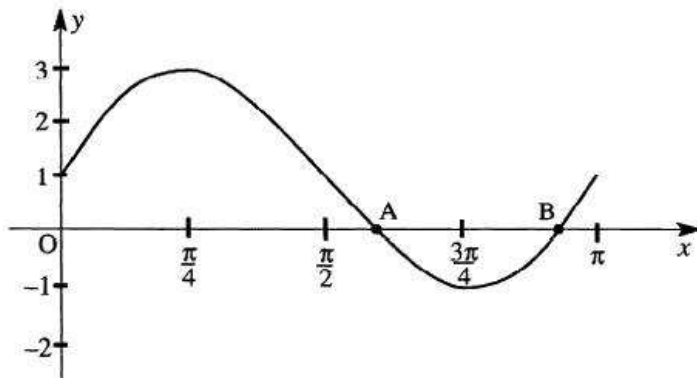
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[SQA] 7. Find, correct to one decimal place, the value of  $x$  between 180 and 270 which satisfies the equation  $3 \cos(2x^\circ - 40^\circ) - 1 = 0$ . 5

[SQA] 8. If  $f(a) = 6 \sin^2 a - \cos a$ , express  $f(a)$  in the form  $p \cos^2 a + q \cos a + r$ .  
Hence solve, correct to three decimal places, the equation  $6 \sin^2 a - \cos a = 5$  for  $0 \leq a \leq \pi$ . 4

[SQA] 9. The diagram below shows the graph of  $y = 2 \sin 2x + 1$  for  $0 \leq x \leq \pi$ .

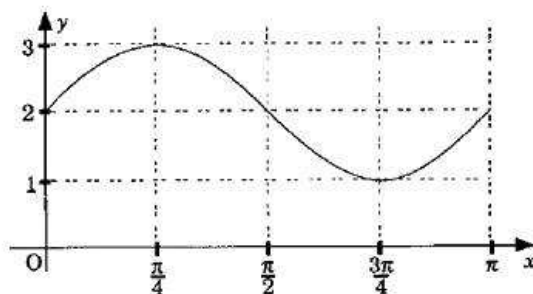


- (a) Find the coordinates of A and B (as shown in the diagram) by solving an appropriate equation algebraically. (5)
- (b) The points  $(0, 2)$  and  $(\pi, 0)$  are joined by a straight line  $l$ . In how many points does  $l$  intersect the given graph? (1)
- (c) C is the point on the given graph with an  $x$ -coordinate of  $\frac{\pi}{2}$ . Explain whether C is above, below or on the line  $l$ . (3)

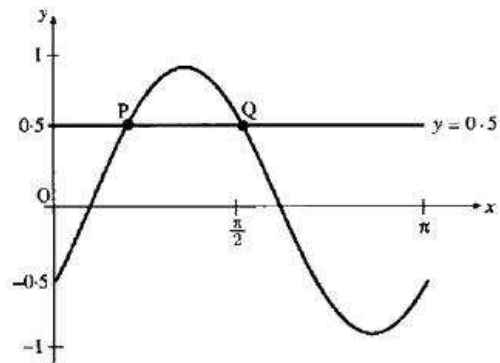
[SQA] 10. Solve the equation  $2 \cos^2 x = \frac{1}{2}$ , for  $0 \leq x \leq \pi$ . 3

[SQA] 11. The diagram shows the graph of the function  $y = a + b \sin cx$  for  $0 \leq x \leq \pi$ .

- (a) Write down the values of  $a$ ,  $b$  and  $c$ . 3
- (b) Find algebraically the values of  $x$  for which  $y = 2.5$ . 3



- [SQA] 12. The diagram shows a sketch of the graph of  $y = \sin\left(2x - \frac{\pi}{6}\right)$ ,  $0 \leq x \leq \pi$ , and the straight line  $y = 0.5$ . These graphs intersect at P and Q.



Find algebraically the coordinates of P and Q.

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- [SQA] 13. Solve the equation  $2 \sin\left(2x - \frac{\pi}{6}\right) = 1$ ,  $0 \leq x < 2\pi$ .

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- [SQA] 14. Functions  $f(x) = \sin x$ ,  $g(x) = \cos x$  and  $h(x) = x + \frac{\pi}{4}$  are defined on a suitable set of real numbers.

(a) Find expressions for:

(i)  $f(h(x))$ ;

(ii)  $g(h(x))$ .

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(b) (i) Show that  $f(h(x)) = \frac{1}{\sqrt{2}} \sin x + \frac{1}{\sqrt{2}} \cos x$ .

(ii) Find a similar expression for  $g(h(x))$  and hence solve the equation  $f(h(x)) - g(h(x)) = 1$  for  $0 \leq x \leq 2\pi$ .

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[END OF QUESTIONS]