

1. What is the value of  $\sin\left(\frac{\pi}{3}\right) - \cos\left(\frac{5\pi}{4}\right)$ ?

A  $\frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}}$

B  $\frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}}$

C  $\frac{1}{2} - \frac{1}{\sqrt{2}}$

D  $\frac{1}{2} + \frac{1}{\sqrt{2}}$

2. What is the value of  $1 - 2\sin^2 15^\circ$ ?

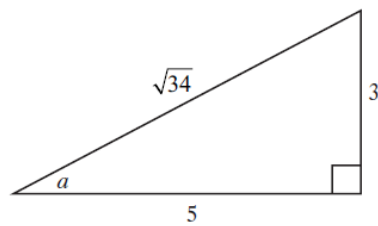
A  $\frac{1}{2}$

B  $\frac{3}{4}$

C  $\frac{\sqrt{3}}{2}$

D  $\frac{7}{8}$

3. A right-angled triangle has sides and angles as shown in the diagram.



What is the value of  $\sin 2a$ ?

A  $\frac{8}{17}$

B  $\frac{3}{\sqrt{34}}$

C  $\frac{15}{17}$

D  $\frac{6}{\sqrt{34}}$

4. Solve  $\tan\left(\frac{x}{2}\right) = -1$  for  $0 \leq x < 2\pi$ .

A  $\frac{\pi}{2}$

B  $\frac{7\pi}{8}$

C  $\frac{3\pi}{2}$

D  $\frac{15\pi}{8}$

5. Solve the equation

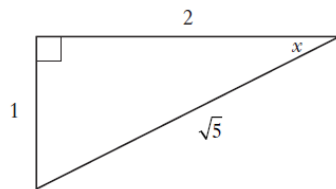
$$\sin x - 2 \cos 2x = 1 \quad \text{for } 0 \leq x < 2\pi.$$

5

6. If  $0 < a < 90$ , which of the following is equivalent to  $\cos(270 - a)^\circ$ ?

- A  $\cos a^\circ$
- B  $\sin a^\circ$
- C  $-\cos a^\circ$
- D  $-\sin a^\circ$

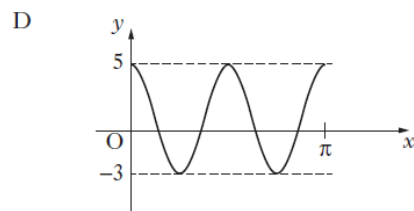
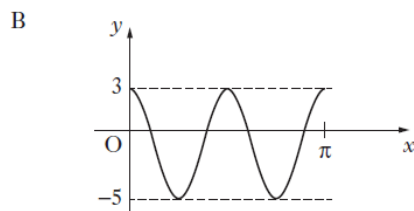
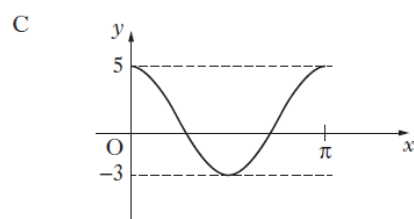
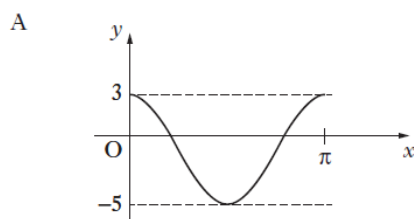
7. The diagram shows a right-angled triangle with sides and angles as marked.



Find the value of  $\sin 2x$ .

- A  $\frac{4}{5}$
- B  $\frac{2}{5}$
- C  $\frac{2}{\sqrt{5}}$
- D  $\frac{1}{\sqrt{5}}$

8. Which of the following shows the graph of  $y = 4\cos 2x - 1$ , for  $0 \leq x \leq \pi$ ?



9. Solve algebraically the equation

$$\sin 2x = 2 \cos^2 x \quad \text{for } 0 \leq x < 2\pi$$

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10 Given that  $\tan 2x = \frac{3}{4}$ ,  $0 < x < \frac{\pi}{4}$ , find the exact value of

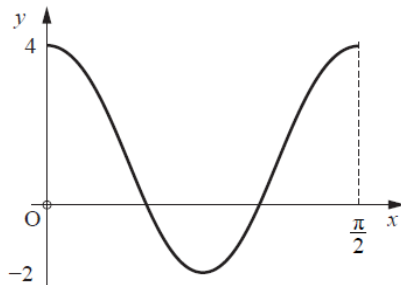
(a)  $\cos 2x$

1

(b)  $\cos x$ .

2

11 The diagram shows part of the graph of the function  $y = p \cos qx + r$ .



Write down the values of  $p$ ,  $q$  and  $r$ .

3

12 Find the maximum value of

$$2 - 3 \sin \left( x - \frac{\pi}{3} \right)$$

and the value of  $x$  where this occurs in the interval  $0 \leq x \leq 2\pi$ .

	max value	$x$
A	-1	$\frac{11\pi}{6}$
B	5	$\frac{11\pi}{6}$
C	-1	$\frac{5\pi}{6}$
D	5	$\frac{5\pi}{6}$

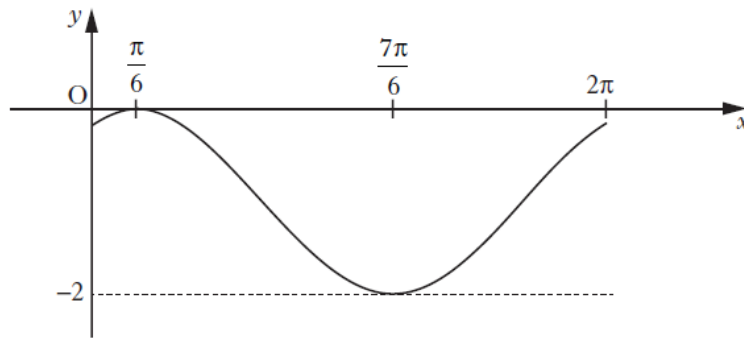
13 (a) Solve  $\cos 2x^\circ - 3 \cos x^\circ + 2 = 0$  for  $0 \leq x < 360$ .

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

2

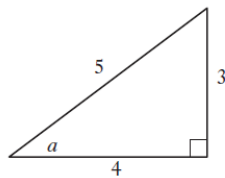
- 14 The diagram shows the curve with equation of the form  $y = \cos(x + a) + b$  for  $0 \leq x \leq 2\pi$ .



What is the equation of this curve?

- A  $y = \cos\left(x - \frac{\pi}{6}\right) - 1$   
 B  $y = \cos\left(x - \frac{\pi}{6}\right) + 1$   
 C  $y = \cos\left(x + \frac{\pi}{6}\right) - 1$   
 D  $y = \cos\left(x + \frac{\pi}{6}\right) + 1$

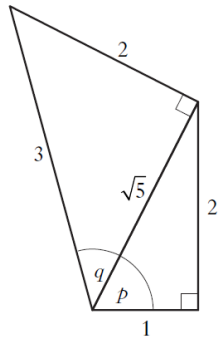
- 15 The diagram shows a right-angled triangle with sides and angles as marked.



What is the value of  $\cos 2a$ ?

- A  $\frac{7}{25}$   
 B  $\frac{3}{5}$   
 C  $\frac{24}{25}$   
 D  $\frac{6}{5}$
- 16 Solve  $2 \cos x = \sqrt{3}$  for  $x$ , where  $0 \leq x < 2\pi$ .

- 17 The diagram shows two right-angled triangles with sides and angles as given.



What is the value of  $\sin(p + q)$ ?

## Solutions

1 B

2 C

3 C

4 C

5  $x = 0.85, 4.7, 5.4$

6 D

7 A

8 A

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

10(a)  $\frac{4}{5}$

(b)  $\frac{3}{\sqrt{10}}$

11  $p=3, q=4, r=1$

12 B

13(a)  $x = 0, 60, 300, 360$

(b)  $x = 0, 30, 150, 180$

14 A

15 A

16  $x = \frac{\pi}{6}, \frac{11\pi}{6}$

17  $\frac{2\sqrt{5}+1}{3\sqrt{5}}$