

1. [CHIC SJCS 15 (modified)]

(a) On the same axes sketch, for $0^\circ \leq x \leq 60^\circ$, the graphs of

$$y = 2 \sin 6x \quad \text{and} \quad y = 2 - \frac{3}{2} \cos 6x.$$

[3]

(b) Explain how the graphs in (a) can be used to find the solutions of $3 \cos 2A + 4 \sin 2A = 4$.

[2]

2. [FMS 16] On the same axes, sketch the graphs of

$$y = 3 \cos 2x \quad \text{and} \quad y = |\sin x|$$

for the interval $0 \leq x \leq 2\pi$, labelling each graph clearly.

State the number of solutions in the interval $0 \leq x \leq 2\pi$ of the equation $3 \cos 2x = |\sin x|$.

[4]

3. [AHS 15]

The curve $y = P \cos Qx + R$ has a period of 720° , a maximum value of 8 and a minimum value of -4 .

(a) Given that P is a negative constant and Q and R are positive constants, find the value of P, Q and R .

[4]

(b) Solve the equation $y = 3$ where $0^\circ < x < 360^\circ$.

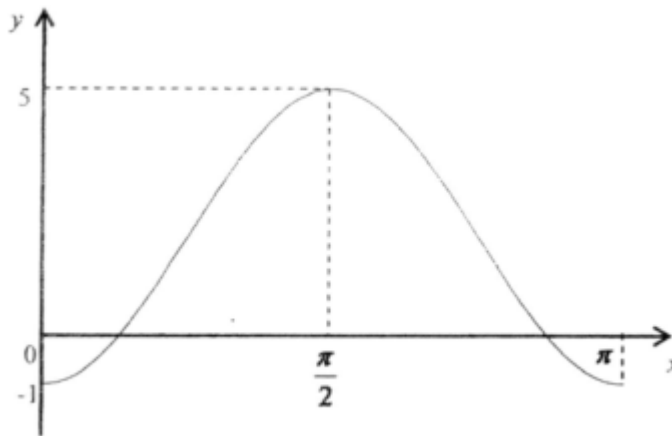
[2]

(c) Sketch the graph of y for $0^\circ < x < 360^\circ$.

[3]

4. [ACSI 15]

The diagram shows the graph of $y = c + a \cos bx$ where a, b and c are constants.



(a) Use the graph to determine the value of a, b and c .

[3]

(b) By using the values of a, b and c found in (a), determine the equation of the straight line that needs to be drawn on the same diagram to solve

$$\sec bx = \frac{a\pi}{x - \pi c}.$$

[2]

5. [Anderson 15]

A and B lie in the same quadrant such that $\sin A = \frac{3}{5}$ and $\tan B = -\frac{5}{12}$. If the value of A and of B is between 0 and 2π , find, without using a calculator, the values of

- (a) $\sin B$,
- (b) $\cot(A - B)$,
- (c) $\cos \frac{B}{2}$.

[1]
[2]
[3]

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Answers

2. 4.

3. (a) $P = -6, Q = \frac{1}{2}, R = 2$.

(b) 199.2° .

4. (a) $a = -3, b = 2, c = 2$.

(b) $y = \frac{x}{\pi}$.

5. (a) $\frac{5}{13}$.

(b) $-\frac{63}{16}$.

(c) $\frac{\sqrt{26}}{26}$.