JAN 2007

6. Find all the solutions, in the interval $0 \leqslant x < 2\pi$, of the equation

$$2\cos^2 x + 1 = 5\sin x,$$

giving each solution in terms of π.

(6)

JAN 2008

Leave blank

4. (a) Show that the equation

$$3 \sin^2 \theta - 2 \cos^2 \theta = 1$$

can be written as

$$5 \sin^2 \theta = 3.$$

(2)

(b) Hence solve, for $0° \leqslant \theta < 360°$, the equation

$$3 \sin^2 \theta - 2 \cos^2 \theta = 1,$$

giving your answers to 1 decimal place.

(7)

JAN
~~JUNE~~ 2009

Leave blank

8. (a) Show that the equation

$$4\sin^2 x + 9\cos x - 6 = 0$$

can be written as

$$4\cos^2 x - 9\cos x + 2 = 0.$$

(2)

(b) Hence solve, for $0 \leqslant x < 720°$,

$$4\sin^2 x + 9\cos x - 6 = 0,$$

giving your answers to 1 decimal place.

(6)

JAN 2010

Leave blank

2. (a) Show that the equation

$$5\sin x = 1 + 2\cos^2 x$$

can be written in the form

$$2\sin^2 x + 5\sin x - 3 = 0$$

(2)

(b) Solve, for $0 \leqslant x < 360°$,

$$2\sin^2 x + 5\sin x - 3 = 0$$

(4)

Q2

(Total 6 marks)

Leave blank

7. (a) Show that the equation

$$3\sin^2 x + 7\sin x = \cos^2 x - 4$$

can be written in the form

$$4\sin^2 x + 7\sin x + 3 = 0$$

(2)

(b) Hence solve, for $0 \leqslant x < 360°$,

$$3\sin^2 x + 7\sin x = \cos^2 x - 4$$

giving your answers to 1 decimal place where appropriate.

(5)

C2 Jan 2012

Leave blank

9. (i) Find the solutions of the equation $\sin(3x-15^\circ)=\frac{1}{2}$, for which $0 \leqslant x \leqslant 180^\circ$

(6)

(ii)

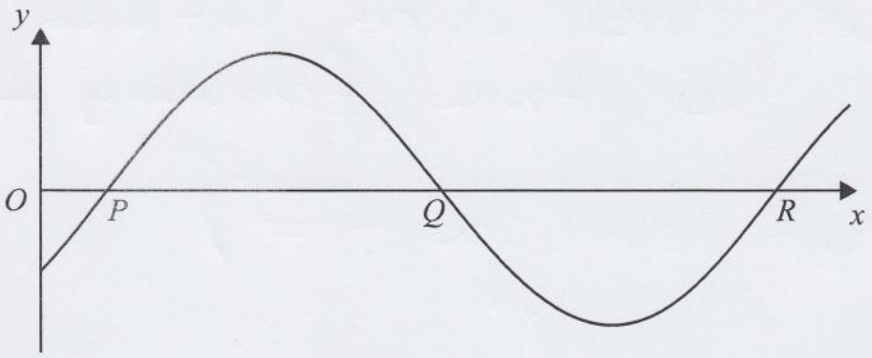

Figure 4

Figure 4 shows part of the curve with equation

$$y=\sin(ax-b), \text{ where } a>0,\ 0<b<\pi$$

The curve cuts the x-axis at the points P, Q and R as shown.

Given that the coordinates of P, Q and R are $\left(\frac{\pi}{10}, 0\right)$, $\left(\frac{3\pi}{5}, 0\right)$ and $\left(\frac{11\pi}{10}, 0\right)$ respectively, find the values of a and b.

(4)

JUNE 2008

Leave blank

9. Solve, for $0 \leqslant x < 360°$,

(a) $\sin(x - 20°) = \dfrac{1}{\sqrt{2}}$

(4)

(b) $\cos 3x = -\dfrac{1}{2}$

(6)

JUNE 2009

Leave blank

7. (i) Solve, for $-180° \leqslant \theta < 180°$,

$$(1+\tan\theta)(5\sin\theta-2)=0.$$

(4)

JUNE 2009

Leave blank

7 (ii) Solve, for $0 \leqslant x < 360°$,

$$4\sin x = 3\tan x.$$

(6)

Q7

(Total 10 marks)

C2 June 2010

Leave blank

5. (a) Given that $5\sin\theta = 2\cos\theta$, find the value of $\tan\theta$.

(1)

(b) Solve, for $0 \leqslant x < 360°$,

$$5\sin 2x = 2\cos 2x,$$

giving your answers to 1 decimal place.

(5)

MAY 2006

Leave blank

6. (a) Given that $\sin \theta = 5\cos \theta$, find the value of $\tan \theta$.

(1)

(b) Hence, or otherwise, find the values of θ in the interval $0 \leqslant \theta < 360°$ for which

$$\sin \theta = 5\cos \theta,$$

giving your answers to 1 decimal place.

(3)

MAY 2007

Leave blank

9. (a) Sketch, for $0 \leqslant x \leqslant 2\pi$, the graph of $y = \sin\left(x + \frac{\pi}{6}\right)$.

(2)

(b) Write down the exact coordinates of the points where the graph meets the coordinate axes.

(3)

(c) Solve, for $0 \leqslant x \leqslant 2\pi$, the equation

$$\sin\left(x + \frac{\pi}{6}\right) = 0.65 ,$$

giving your answers in radians to 2 decimal places.

(5)

Leave blank

7. (a) Solve for $0 \leqslant x < 360°$, giving your answers in degrees to 1 decimal place,

$$3\sin(x+45°) = 2$$

(4)

(b) Find, for $0 \leqslant x < 2\pi$, all the solutions of

$$2\sin^2 x + 2 = 7\cos x$$

giving your answers in radians.

You must show clearly how you obtained your answers.

(6)

C2 May 2012

Leave blank

6. (a) Show that the equation

$$\tan 2x = 5 \sin 2x$$

can be written in the form

$$(1 - 5 \cos 2x) \sin 2x = 0$$

(2)

(b) Hence solve, for $0 \leqslant x \leqslant 180°$,

$$\tan 2x = 5 \sin 2x$$

giving your answers to 1 decimal place where appropriate.
You must show clearly how you obtained your answers.

(5)

C2 Jan 2013

Leave blank

4. Solve, for $0 \leqslant x < 180°$,

$$\cos(3x - 10°) = -0.4$$

giving your answers to 1 decimal place. You should show each step in your working.

(7)

C2 MAY 2013

Leave blank

8. (i) Solve, for $-180° \leqslant x < 180°$,

$$\tan(x - 40°) = 1.5$$

giving your answers to 1 decimal place.

(3)

(ii) (a) Show that the equation

$$\sin\theta \tan\theta = 3\cos\theta + 2$$

can be written in the form

$$4\cos^2\theta + 2\cos\theta - 1 = 0$$

(3)

(b) Hence solve, for $0 \leqslant \theta < 360°$,

$$\sin\theta \tan\theta = 3\cos\theta + 2$$

showing each stage of your working.

(5)