AS Final Exam : Revision 5 Trigonometry

P1 June 08

1 In the triangle ABC, $AB = 12$ cm, angle $BAC = 60°$ and angle $ACB = 45°$. Find the exact length of BC. [3]

2 (i) Show that the equation $2\tan^2\theta\cos\theta = 3$ can be written in the form $2\cos^2\theta + 3\cos\theta - 2 = 0$. [2]

(ii) Hence solve the equation $2\tan^2\theta\cos\theta = 3$, for $0° \leqslant \theta \leqslant 360°$. [3]

P1 Nov 08

5 **(i)** Show that the equation $3\sin x\tan x = 8$ can be written as $3\cos^2 x + 8\cos x - 3 = 0$. **[3]**

(ii) Hence solve the equation $3\sin x\tan x = 8$ for $0° \leqslant x \leqslant 360°$. **[3]**

P1 June 07

3 Prove the identity $\dfrac{1-\tan^2 x}{1+\tan^2 x} \equiv 1 - 2\sin^2 x$. [4]

8 The function f is defined by $f(x) = a + b\cos 2x$, for $0 \leqslant x \leqslant \pi$. It is given that $f(0) = -1$ and $f(\frac{1}{2}\pi) = 7$.

(i) Find the values of a and b. **[3]**

(ii) Find the x-coordinates of the points where the curve $y = f(x)$ intersects the x-axis. **[3]**

(iii) Sketch the graph of $y = f(x)$. **[2]**

P1 Nov 07

5 **(i)** Show that the equation $3\sin x\tan x = 8$ can be written as $3\cos^2 x + 8\cos x - 3 = 0$. **[3]**

(ii) Hence solve the equation $3\sin x\tan x = 8$ for $0° \leqslant x \leqslant 360°$. **[3]**

P1 June 06

2 Solve the equation

$$\sin 2x + 3\cos 2x = 0,$$

for $0° \leqslant x \leqslant 180°$. [4]

P1 Nov 06

2 Given that $x = \sin^{-1}\left(\frac{2}{5}\right)$, find the exact value of

(i) $\cos^2 x$, [2]

(ii) $\tan^2 x$. [2]

P1 June 05

3 (i) Show that the equation $\sin\theta + \cos\theta = 2(\sin\theta - \cos\theta)$ can be expressed as $\tan\theta = 3$. [2]

(ii) Hence solve the equation $\sin\theta + \cos\theta = 2(\sin\theta - \cos\theta)$, for $0° \leqslant \theta \leqslant 360°$. [2]

P1 Nov 05

1 Solve the equation $3\sin^2\theta - 2\cos\theta - 3 = 0$, for $0° \leqslant \theta \leqslant 180°$. [4]

P1 June 04

3 (i) Show that the equation $\sin^2\theta + 3\sin\theta\cos\theta = 4\cos^2\theta$ can be written as a quadratic equation in $\tan\theta$. [2]

(ii) Hence, or otherwise, solve the equation in part (i) for $0° \leqslant \theta \leqslant 180°$. [3]

P1 Nov 04

4 (i) Sketch and label, on the same diagram, the graphs of $y = 2\sin x$ and $y = \cos 2x$, for the interval $0 \leqslant x \leqslant \pi$. [4]

(ii) Hence state the number of solutions of the equation $2\sin x = \cos 2x$ in the interval $0 \leqslant x \leqslant \pi$. [1]

6 The function $f : x \mapsto 5\sin^2 x + 3\cos^2 x$ is defined for the domain $0 \leqslant x \leqslant \pi$.

(i) Express $f(x)$ in the form $a + b\sin^2 x$, stating the values of a and b. [2]

(ii) Hence find the values of x for which $f(x) = 7\sin x$. [3]

(iii) State the range of f. [2]

P1 June 03

2 Find all the values of x in the interval $0° \leqslant x \leqslant 180°$ which satisfy the equation $\sin 3x + 2\cos 3x = 0$. [4]

6 (i) Sketch the graph of the curve $y = 3\sin x$, for $-\pi \leqslant x \leqslant \pi$. [2]

The straight line $y = kx$, where k is a constant, passes through the maximum point of this curve for $-\pi \leqslant x \leqslant \pi$.

(ii) Find the value of k in terms of π. [2]

(iii) State the coordinates of the other point, apart from the origin, where the line and the curve intersect. [1]

P1 Nov 03

2 (i) Show that the equation $4\sin^4\theta + 5 = 7\cos^2\theta$ may be written in the form $4x^2 + 7x - 2 = 0$, where $x = \sin^2\theta$. [1]

(ii) Hence solve the equation $4\sin^4\theta + 5 = 7\cos^2\theta$, for $0° \leqslant \theta \leqslant 360°$. [4]

P1 June 02

2 (i) Show that $\sin x \tan x$ may be written as $\dfrac{1 - \cos^2 x}{\cos x}$. [1]

(ii) Hence solve the equation $2\sin x \tan x = 3$, for $0° \leqslant x \leqslant 360°$. [4]

6 The function f, where $f(x) = a\sin x + b$, is defined for the domain $0 \leqslant x \leqslant 2\pi$. Given that $f(\frac{1}{2}\pi) = 2$ and that $f(\frac{3}{2}\pi) = -8$,

(i) find the values of a and b, [3]

(ii) find the values of x for which $f(x) = 0$, giving your answers in radians correct to 2 decimal places, [2]

(iii) sketch the graph of $y = f(x)$. [2]

P1 Nov 02

5 (i) Show that the equation $3\tan\theta = 2\cos\theta$ can be expressed as

$$2\sin^2\theta + 3\sin\theta - 2 = 0. \qquad [3]$$

(ii) Hence solve the equation $3\tan\theta = 2\cos\theta$, for $0° \leqslant \theta \leqslant 360°$. [3]