Trig Identities and Unit Circle   c = calc   nc = no calc

1)c   Find all solutions of the equation $\cos 3x = \cos(0.5x)$, for $0 \le x \le \pi$.

2)c   Given that $\sin x = \dfrac{1}{3}$, where x is an acute angle, find the **exact** value of

(a) $\cos x$;

(b) $\cos 2x$.

3)c   Solve the equation $3\sin^2 x = \cos^2 x$, for $0° \le x \le 180°$.

4)c   (a)   Factorize the expression $3\sin^2 x - 11\sin x + 6$.

(b)   Consider the equation $3\sin^2 x - 11\sin x + 6 = 0$.

(i)   Find the two values of $\sin x$ which satisfy this equation.

(ii)   Solve the equation, for $0° \le x \le 180°$.

5)c   Solve the equation $2\cos^2 x = \sin 2x$ for $0 \le x \le \pi$, giving your answers in terms of π.

6)c   Consider $y = \sin\left(x + \dfrac{\pi}{9}\right)$.

(a)   The graph of y intersects the x-axis at point A. Find the x-coordinate of A, where $0 \le x \le \pi$.

(b)   Solve the equation $\sin\left(x + \dfrac{\pi}{9}\right) = -\dfrac{1}{2}$, for $0 \le x \le 2\pi$.

7)c   Consider the equation $3\cos 2x + \sin x = 1$.

(a)   Write this equation in the form $f(x) = 0$, where $f(x) = p\sin^2 x + q\sin x + r$, and $p, q, r \in \mathbb{Z}$.

(b)   Factorize $f(x)$.

(c)   Write down the number of solutions of $f(x) = 0$, for $0 \le x < 2\pi$.