WAVE FUNCTION **SET 1**

1 (a) Express $\sin x^\circ - 2\cos x^\circ$ in the form $k\cos(x+\alpha)^\circ$, $k>0, 0\le\alpha\le 360$

(b) Express $3\cos x + 5\sin x$ in the form $k\sin(x-\alpha)$, $k>0$, $0\le\alpha\le 2\pi$

(c) Express $\sqrt{3}\sin 3x + \cos 3x$ in the form $k\sin(3x-\alpha)$, $k>0, 0\le\alpha\le 2\pi$

2 Find the maximum value of $5\cos x + 5\sin x$.

3 Solve the equation $6\cos x^\circ + 2\sin x^\circ - 5 = 0$, $0\le x\le 360$

4 (a) Express $\sin x + \sqrt{3}\cos x$ in the form $k\cos(x-a)$, $k>0$ and $0\le a\le 2\pi$.

(b) Hence, sketch the graph of the function $f(x) = 4 + \sin x + \sqrt{3}\cos x$, $0\le x\le 2\pi$

5 The power, *P* units, produced by a tidal electric sub-station can be expressed in the form $P = 8\cos\frac{1}{2}t - 6\sin\frac{1}{2}t$, where *t* is the time in hours with $t>0$.

(a) Express *P* in the form $k\cos\left(\frac{1}{2}t+\alpha\right)$, where $k>0$ and $0<\alpha<\frac{\pi}{2}$.

(b) Hence write down the maximum power produced and the first time this maximum power will occur.