Wave Equation radians

1. Express each of the following in the form
$k\cos(x-\alpha)$ where $k > 0$ and $0 \le \alpha \le 2\pi$

a) $\sqrt{3}\cos x + \sin x$ b) $4\cos x + 3\sin x$ c) $2\cos x + \sin x$

d) $\cos x - \sin x$ e) $2\cos x + \sqrt{2}\sin x$ f) $\sqrt{3}\cos x - \sin x$

(i) Write down the maximum value of each of the above and the value of x at which this maximum occurs.

(ii) Write down the minimum value of each of the above and the value of x at which this minimum occurs.

2. Express each of the following in the form
$k\cos(x+\alpha)$ where $k > 0$ and $0 \le \alpha \le 2\pi$

a) $\cos x - \sin x$ b) $12\cos x - 5\sin x$ c) $24\cos x - 7\sin x$

d) $\cos x - \sqrt{2}\sin x$ e) $\sqrt{3}\cos x - \sin x$ f) $\sqrt{3}\cos x + 2\sin x$

(i) Write down the maximum value of each of the above and the value of x at which this maximum occurs.

(ii) Write down the minimum value of each of the above and the value of x at which this minimum occurs.

3. Express each of the following in the form

$k\sin(x+\alpha)$ where $k > 0$ and $0 \le \alpha \le 2\pi$

a) cosx + sinx b) √3cosx + 2sinx c) cosx + √2sinx

d) 2cosx + 3 sinx e) 6cosx + 3sinx f) √3cosx + 4sinx

(i) Write down the maximum value of each of the above and the value of x at which this maximum occurs.

(ii) Write down the minimum value of each of the above and the value of x at which this minimum occurs.

4. Express each of the following in the form

$k\sin(x-\alpha)$ where $k > 0$ and $0 \le \alpha \le 2\pi$

a) 2sinx – cosx b) sinx - cosx c) 3sinx – 4 cosx

d) 5sinx – 12cosx e) -4cosx + sinx f) -√2cosx +√2sinx

(i) Write down the maximum value of each of the above and the value of x at which this maximum occurs.

(ii) Write down the minimum value of each of the above and the value of x at which this minimum occurs.