SPTA
Higher Homework
Wave Equation (A)

1. Express $5\cos x° - 12\sin x°$ in the form $k\sin(x + \alpha)°$ where $k > 0$ and $0 \leq x \leq 360$ **(4)**

2. (a) Express $\sqrt{3}\cos x – \sin x$ in the form $k\cos(x + a)$ where $k > 0$ and $0 \leq x \leq 360$ **(4)**

   (b) Hence solve the equation $\sqrt{3}\cos x – \sin x = -1$ for $0 \leq x \leq 360$ **(3)**

3. What is the maximum value of the function:

$$f(\theta) = \cos\theta° – \sin\theta° \quad (0 \leq \theta \leq 360)$$

   and the corresponding value of θ ? **(6)**

4. (a) Express $\sqrt{5}\cos x + 2\sin x$ in the form $k\sin(x + a)$ where $k > 0$ and $0 \leq a \leq 360$ **(4)**

   (b) Hence write down the maximum value of $2 + \sqrt{5}\cos x + 2\sin x$ and the corresponding value of x in the range $0 \leq x \leq 360$. **(2)**

5. If $f(x) = 5\sin x – 6\cos x$

   (a) Show that f(x) can be expressed in the form $k\sin(x – \alpha)$ where $k > 0$ and $0 \leq \alpha \leq 2\pi$, stating the values of α and k. **(4)**

   (b) Working in the interval $0 \leq x \leq 2\pi$, find the maximum and minimum values of the function and find the values of x at which they occur. **(4)**