

Transforming $a\cos(x) + b\sin(x)$ without a calculator

Show that $\cos(x) + \sqrt{3}\sin(x)$ can be written in the form $2\cos(x - \frac{\pi}{3})$.

Use the addition formula to expand $2\cos(x - \frac{\pi}{3})$.

Write $\cos(x) + \sqrt{3}\sin(x)$ in the form $k\sin(x + \alpha)$.

Check your answer.

On the back of this piece of paper, make a reasonably accurate sketch of the graph $y = \cos(x) + \sqrt{3}\sin(x)$ for $0 \leq x \leq 2\pi$, showing where it crosses all the axes, and also the coordinates of the maximum and minimum points.

Solve the equation $\cos(x) + \sqrt{3}\sin(x) + 1 = 0$ for $0 \leq x \leq 2\pi$.

