1. Express $3 \sin x - 2 \cos x$ in the form $k \cos(x + a)$, where $k > 0$ and $0 \le a \le 360$ **(4)**

2. (a) Rewrite $5 \cos x + 12 \sin x$ in the form $k \cos(x - \alpha)$, where $k > 0$ and $0 \le \alpha \le 360$ **(4)**

(b) Hence solve the equation $5 \cos x + 12 \sin x - 13 = 0$, $0 \le \alpha \le 360$ **(3)**

3. Solve the equation $\sqrt{3} \sin x - \cos x = 1$, $0 \le \alpha \le 2\pi$ **(4)**

4. When two sound waves are added together the volume, V, at any time, t seconds, is given by
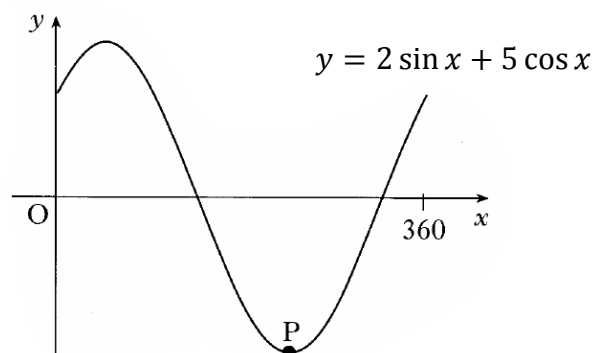
$$V(t) = 40 \cos t + 20 \sin t$$

Find the maximum volume and the time t at which this maximum first occurs **(6)**

5. Part of the graph of
$y = 2 \sin x + 5 \cos x$
is shown in the diagram

(a) Express $y = 2 \sin x + 5 \cos x$
in the form $k \sin(x + a)$ where
$k > 0$ and $0 \le a \le 360$ **(4)**

(b) Find the coordinates of the
minimum turning point P **(2)**