

Wave questions

- [SQA] 1. Solve the equation $2 \sin x^\circ - 3 \cos x^\circ = 2.5$ in the interval $0 \leq x < 360$. 8
2. (a) $12 \cos x^\circ - 5 \sin x^\circ$ can be expressed in the form $k \cos(x + a)^\circ$, where $k > 0$ and $0 \leq a < 360$.
Calculate the values of k and a . 4
- (b) (i) Hence state the maximum and minimum values of $12 \cos x^\circ - 5 \sin x^\circ$.
(ii) Determine the values of x , in the interval $0 \leq x < 360$, at which these maximum and minimum values occur. 3
- [SQA] 3. (a) Express $\sin x^\circ - 3 \cos x^\circ$ in the form $k \sin(x - a)^\circ$ where $k > 0$ and $0 \leq a < 360$. Find the values of k and a . 4
- (b) Find the maximum value of $5 + \sin x^\circ - 3 \cos x^\circ$ and state a value of x for which this maximum occurs. 2
- [SQA] 4.
- (a) Show that $2 \cos(x^\circ + 30^\circ) - \sin x^\circ$ can be written as $\sqrt{3} \cos x^\circ - 2 \sin x^\circ$. 3
- (b) Express $\sqrt{3} \cos x^\circ - 2 \sin x^\circ$ in the form $k \cos(x^\circ + \alpha^\circ)$ where $k > 0$ and $0 \leq \alpha \leq 360$ and find the values of k and α . 4
- (c) Hence, or otherwise, solve the equation $2 \cos(x^\circ + 30^\circ) = \sin x^\circ + 1$, $0 \leq x \leq 360$. 3
- [SQA] 5. (a) Express $3 \sin x^\circ - \cos x^\circ$ in the form $k \sin(x - \alpha)^\circ$, where $k > 0$ and $0 \leq \alpha \leq 90$. (4)
- (b) Hence find algebraically the values of x between 0 and 180 for which $3 \sin x^\circ - \cos x^\circ = \sqrt{5}$. (4)
- (c) Find the range of values of x between 0 and 180 for which $3 \sin x^\circ - \cos x^\circ \leq \sqrt{5}$. (2)
- [SQA] 6. Find the maximum value of $\cos x - \sin x$ and the value of x for which it occurs in the interval $0 \leq x \leq 2\pi$. 6

[END OF QUESTIONS]