

Higher Ink Exercise Block 3 – Wave Function

Only use calculators when necessary

1. Express $\sin x - \sqrt{3} \cos x$ in the form $k \sin(x - a)$ where $k > 0$ and $(0 \leq a \leq 2\pi)$. (6)

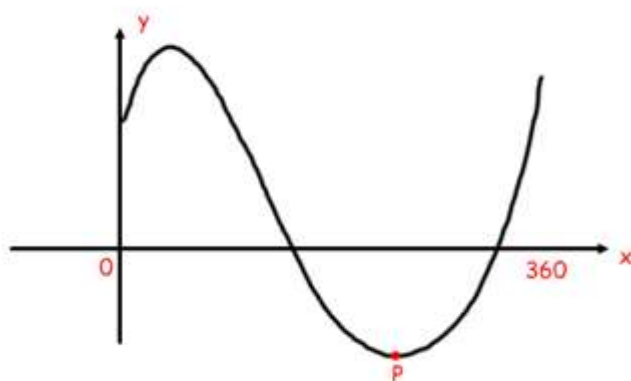
2. Write down the minimum value of $3 + \sqrt{2} \cos(x + 20)^\circ$ and find the value of x ($0 \leq x \leq 360$) for which it occurs. (3)

3. Find the maximum value of $\sin x - \cos x$, and the value of x , $0 \leq x \leq 2\pi$ for which it occurs. (9)

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

a) Express $y = 2 \sin x + 5 \cos x$ in the form $k \sin(x + a)^\circ$ where $k > 0$ and $0^\circ \leq a^\circ \leq 360^\circ$. (6)

b) Find the coordinates of the turning point P. (4)



5. Solve the equation $\log_2(x+1) - 2 \log_2(3) = 3$. (4)

6. Find the value(s) of k for which the equation $(x+2)(x+k) = -9$ has equal roots. (5)

Total = 37 marks