

Mathematics Department – Langholm Academy

HIGHER HOMEWORK

UNIT 3

CHAPTER 4

Wave Function

Higher - Unit 3
Wave Function 1

1. Solve the following pairs of simultaneous equations to find k and α
 - a. $k \sin \alpha = 3$
 $k \cos \alpha = 4$
 - b. $k \sin \alpha = -3$
 $k \cos \alpha = 4$
 - c. $k \sin \alpha = \sqrt{3}$
 $k \cos \alpha = -1$
 - d. $k \sin \alpha = -\sqrt{3}$
 $k \cos \alpha = \sqrt{5}$
 - e. $k \sin \alpha = -7$
 $k \cos \alpha = -4$

2. Write the following in the form indicated $0 \leq \alpha \leq 360^\circ$
 - a. $f(x) = 4 \sin x + \cos x$ in the form $k \cos(x - \alpha)$
 - b. $f(x) = 12 \sin x + 5 \cos x$ in the form $k \sin(x - \alpha)$
 - c. $f(x) = \sqrt{8} \sin x - \sqrt{8} \cos x$ in the form $k \sin(x - \alpha)$

3. Find the first maximum and minimum values of the following and state the corresponding value of x in the range $0 \leq x \leq 360^\circ$
 - a. $f(x) = 3 \sin(x + 20)$
 - b. $f(x) = \sqrt{3} \cos(x - 60)$
 - c. $f(x) = 5 \sin(2x - 60)$
 - d. $f(x) = 6 \cos(3x + 20) + 5$

4. Find the maximum value of the following and state the corresponding value of x in the range $0 \leq x \leq 360^\circ$
 - a. $5 \sin x + 12 \cos x$
 - b. $3 \sin x - 4 \cos x$

5. Solve the following $0 \leq x \leq 360^\circ$
 - a. $3 \sin(x + 20) = 2$
 - b. $\sqrt{5} \cos(x - 50) = 1$
 - c. $5 \sin x - 12 \cos x = 4$
 - d. $3 \sin 2x - 4 \cos 2x - 2 = 1$

Note : 5d has an angle of $2x$ so remember when solving to get initial solutions do **two** revolutions of the CAST circle or you will not get the last two answers in the range.