

Homework Section 4.0 - Due 25th May

- Suppose $f(x)$ is a periodic function with $p = 8$.
Suppose further that $f(1) = 4$, $f(0) = -6$, $f(-2) = -2$. If possible, compute
 - $f(-20)$.
 - $f(56)$.
- Suppose $f(x)$ is a periodic function with $p = 7$ and $f(85) = 13$, $f(214) = 12$, $f(38619) = 11$. If possible, compute
 - $f(0)$.
 - $f(1)$.
 - $f(2)$.
- Sketch the graph of

$$f(x) = \begin{cases} 2 & \text{if } x \in [2k, 2k+1) \\ -3 & \text{if } x \in [2k-1, 2k) \end{cases} \quad \text{for all } k \in \mathbb{Z}$$

over the interval $[-5, 5)$.

Is this function periodic? If so, what is its period?

- Mark the following true or false. If true, explain why, if false, give a counterexample:
 - x_1 and x_2 are coterminal angles, then $\cos(x_1) = \cos(x_2)$.
 - If $\cos(x_1) = \cos(x_2)$, then $x_1 = x_2$.
 - If t and s have the same reference angle, then $\cos(t) = \cos(s)$.
 - If $\sin(x_1) = \sin(x_2)$, then their reference angles $x'_1 = x'_2$.
 - If $f(x)$ is a periodic function with $f(x) = 0$ for every integer x , then the period of $f(x)$ must be 1.
- Functions are not integers.
 - Give an explicit example of function that is neither even nor odd.
 - Give an explicit example of function that is both even and odd.
- The amplitude of a periodic function $f(x)$ is given by $a = \frac{|\max(f(x)) - \min(f(x))|}{2}$. Calculate the amplitude of
 - $f(x)$ as in question 3.
 - $f(x) = \sin(x)$.
 - $f(x) = \cos(x)$.

Is it possible to have a function with amplitude of -1?

If possible, give an example of such function, if impossible, explain why.