1. Mark each function as even, odd, or neither:
   (a) $\sin(x)$  
   (b) $e^x$  
   (c) $|x - 1|$  
   (d) $x^5$  
   (e) $x^3 \sin(x)$

2. Let $f(x)$ be the function on $[-3, 3]$ which is graphed below. Find the constant term in the Fourier series for $f$.

   Solution: The constant term is $5/2$, the average value of $f$. The term $a_0 = 5$.

3. The function $f$ (shown below) is defined on the interval $[-2, 2]$. What value does the Fourier series for $f$ converge to:
   (a) When $x = -1$?  
   (b) When $x = 0$?  
   (c) When $x = 1$?  
   (d) When $x = 2$?

   (a) $1/2$  
   (b) $1$  
   (c) $4$  
   (d) $3/2$
4. Let \( f(x) = |x| \) for \(-2 \leq x \leq 2\), and let \( g(x) = 4|x| + 3 \) for \(-2 \leq x \leq 2\). The Fourier series for \( f \) is given by

\[
f(x) = 1 - \frac{8}{\pi^2} \left( \cos \left( \frac{\pi x}{2} \right) + \frac{1}{9} \cos \left( \frac{3\pi x}{2} \right) + \frac{1}{25} \cos \left( \frac{5\pi x}{2} \right) + \cdots \right)
\]

What is the Fourier series for \( g \)?

\[
g(x) = 4f(x) + 3 = 7 - \frac{32}{\pi^2} \left( \cos \left( \frac{\pi x}{2} \right) + \frac{1}{9} \cos \left( \frac{3\pi x}{2} \right) + \frac{1}{25} \cos \left( \frac{5\pi x}{2} \right) + \cdots \right)
\]

5. Let \( f(x) = \begin{cases} 
0 & \text{for } -\pi \leq x < -\pi/2 \\
1 & \text{for } -\pi/2 \leq x < \pi/2 \\
0 & \text{for } \pi/2 < x \leq \pi
\end{cases} \).

Find the Fourier series for \( f \) on the interval \([-\pi, \pi]\).

Give at least four terms in the series or write it as a summation.

\[
\frac{1}{2} + \frac{2 \cos(x)}{\pi} - \frac{2 \cos(3x)}{3\pi} + \frac{2 \cos(5x)}{5\pi} - \cdots
\]