Problem 1.
Evaluate each of the following functions and see if it is periodic. If periodic, find its period.

(a) \( f(t) = \cos \pi t + 2 \cos 3\pi t + 3 \cos 5\pi t \)
(b) \( y(t) = \sin t + 4 \cos 2\pi t \)
(c) \( g(t) = \sin 3t \cos 4t \)
(d) \( h(t) = \cos^2 t \)
(e) \( z(t) = 4.2 \sin (0.4\pi t + 10^\circ) + 0.8 \sin (0.6\pi t + 50^\circ) \)
(f) \( p(t) = 10 \)
(g) \( q(t) = e^{-t} \)

Problem 2.
Obtain the Fourier series expansion for the waveform shown below.

Problem 3.
Find the trigonometric Fourier series for 
\( f(t) = 20 \) for \( 0 < t < \pi \) and \( i.s = 40 \) for \( \pi < t < 2\pi \).
In addition the function is periodic, in other words, \( f(t) = f(t+2\pi) \).

Problem 4.
Find the quadrature (cosine and sine) form of the Fourier series
\[
3 \sum_{n=1}^{\infty} \frac{10}{n^3 + 1} \cos \left(2nt + \frac{n\pi}{4}\right)
\]

Problem 5.
Express the Fourier series
\[
f(t) = 10 + \sum_{n=1}^{\infty} \frac{4}{n^2 + 1} \cos 10nt + \frac{1}{n^3} \sin 10nt
\]
(a) in a cosine and angle form,
(b) in a sine and angle form.

Problem 6.
Determine if these functions are even, odd, or neither.

(a) $1 + t$
(b) $t^2 - 1$
(c) $\cos n\pi t \sin n\pi t$
(d) $\sin^2 \pi t$
(e) $e^t$

Problem 7.
Determine the fundamental frequency and specify the type of symmetry present in the functions shown below.