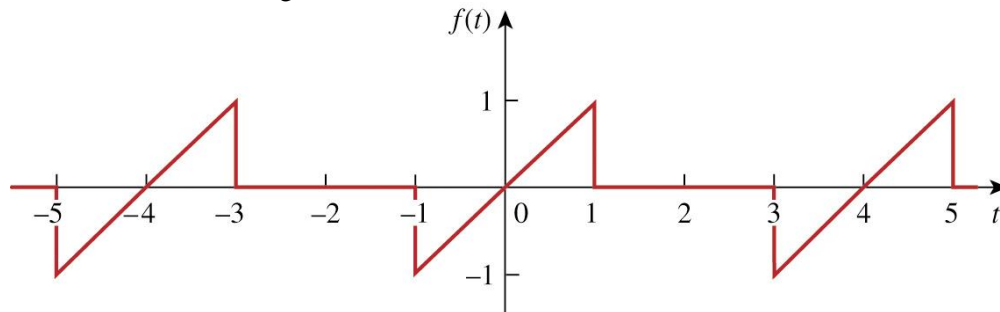All problems refer to the following waveform:



**P1**   **Concept:** Symmetry and FS.
         **Find:**    What kind of symmetry does this waveform have?  What significance does this have on
                      the Fourier Series coefficient values?

**P2**   **Concept:** $a_n$, $b_n$ Fourier Series analysis.
         **Find:**    Find $a_0$, $a_1$, $a_2$, $a_3$, $b_1$, $b_2$, $b_3$ Fourier Series coefficients.  Calculate them numerically, e.g.
                      1.27 not $4/\pi$.
         **Hints:**   • Consider symmetry.
                      • $b_2 = 0.318$

**P3**   **Concept:** $A_n$, $\phi_n$ Fourier Series analysis.
         **Find:**    Find $A_0$, $A_1$, $A_2$, $A_3$, $\phi_1$, $\phi_2$, $\phi_3$ Fourier Series coefficients.  Calculate them numerically,
                      e.g. 1.27 not $4/\pi$.
         **Hint:**    $A_2 = 0.318\angle\text{-}90°$

**P4**   **Concept:** Fourier Series reconstruction.
         **Find:**    Plot the reconstructed function $f(t)$ using the DC and first three harmonics calculated
                      above from $-5 \le t \le 5$.
         **Hints:**   • It should look vaguely similar to the original waveform, especially around t=0
                      • If using Matlab, use `linspace` to make your t vector, and `plot` to plot the result

**P5**   **Extension:** Ungraded thought question.  How would you reconstruct $f(t)$ using the first 1,000
                      harmonics?