Problem 1.16 :

Given: The following functions

a. $x_1(t) = 3t^2 + 4t^4$

b. $x_2(t) = 3t^3$

Find: For each of the following functions, indicate if it exhibits even symmetry, odd symmetry, or neither one.

Problem 1.17 :

Given: The following functions

a. $x_1(t) = 4[\sin(3t) + \cos(3t)]$

b. $x_2(t) = \frac{\sin(3t)}{3t}$

Find: For each function, indicate if it exhibits even symmetry, odd symmetry, or neither one.
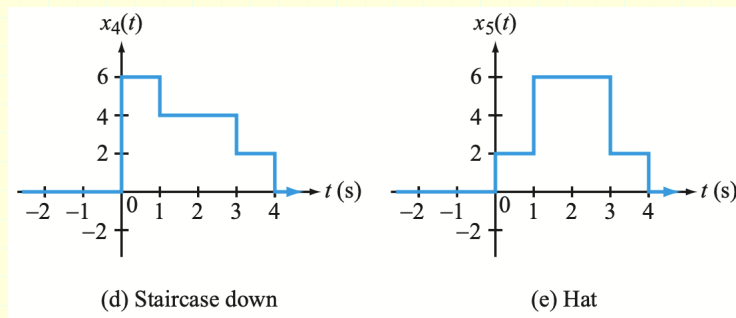
Problem 1.20 :

Given: The following step functions

 b.

 c.

Find: Generate plots for each of the following step-function wave forms over the time span from $-5s$ to $+5s$.

Problem 1.21 :

Given: Figure 1.21

(d) Staircase down   (e) Hat

Find: Provide expressions in terms of step functions for the waveforms displayed in the figure above for d and e.

d. Using $u(t)$ as the step function and $u_T(t)$ is $u(t-T)$

$$x_4(t) = 6u(t) - 2u(t-1) - 2u(t-3)$$

e. Using $u(t)$ as the step function and $u_T(t)$ is $u(t-T)$

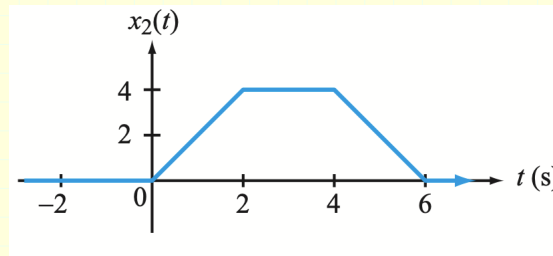$$x_5(t) = 2u(t) + 4u(t-1) - 4u(t-3)$$

Problem 1.22 :

Given: The following functions

a. $x_1(t) = 5r(t+2) - 5r(t)$

d. $x_4(t) = 10\text{rect}\left(\frac{t+1}{2}\right) - 10\text{rect}\left(\frac{t-3}{2}\right)$

Find: Generate plots for each of the above functions over the time span from $-4s$ to $+4s$.

Problem 1.23 :

Given: Figure 1.23

Find: Provide expressions for the waveforms displayed in Fig P1.23 in terms of ramp and step functions (part b).

Problem 1.28 :

Given: The following equation

c. $y_3(t) = \int_{-3}^{-1} t^5 \delta(3t + 2)dt$

Find: Using the sampling property of impulses to compute the above equation.

c. $y_3(t) = \int_{-3}^{-1} t^5 \delta(3t + 2)dt$

Problem 1.29 :

Given: The following equations

b. $y_2(t) = \int_{-\infty}^{\infty} \cos(t)\delta(t - \frac{\pi}{2})dt$

c. $y_3(t) = \int_{-3}^{-1} t^5 t^5 \delta(t + 2)dt$

Find: Using the sampling property of impulses to compute the above equations

Problem 1.35 :

Given: The following signals

b. $x_2(t) = [t\cos(3t)]u(t)$

c. $x_3(t) = [e^{-2t}\sin(t)]u(t)$

Find: Determine if each of the above signals is a power signal, an energy signal or neither.