EXERCISE 9.1: Write a formula for the finite-length sinusoidal signal of Fig. 9-3(b) using a unit-step notation similar to (9.6) to indicate its finite duration.

McClellan, Schafer and Yoder, *Signal Processing First,* ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.

SOLUTION

The period is 0.5 sec. Amplitude is 10.

Phase is $-\pi/2$ because the waveform is a sine.

$$f_0 = \frac{1}{T_0} = \frac{1}{0.5} = 2 \text{ Hz} \quad \Rightarrow \quad \omega_0 = 2\pi f_0 = 4\pi \text{ rad/s}$$

Duration is 3 sec, from $t=0$ to $t=3$.

$$x(t) = 10 \sin(4\pi t)\,[u(t) - u(t-3)]$$

or

$$x(t) = 10 \cos(4\pi t - \pi/2)\,[u(t) - u(t-3)]$$