

**1989 AB3**  
**Solution**

$$(a) v(t) = \int 4 \cos 2t \, dt$$

$$v(t) = 2 \sin 2t + C$$

$$v(0) = 1 \Rightarrow C = 1$$

$$v(t) = 2 \sin 2t + 1$$

$$(b) x(t) = \int 2 \sin 2t + 1 \, dt$$

$$x(t) = -\cos 2t + t + C$$

$$x(0) = 0 \Rightarrow C = 1$$

$$x(t) = -\cos 2t + t + 1$$

$$(c) 2 \sin 2t + 1 = 0$$

$$\sin 2t = -\frac{1}{2}$$

$$2t = \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$t = \frac{7\pi}{12}, \frac{11\pi}{12}$$