

(a) $x(t) = 8\cos t \Rightarrow v(t) = x'(t) = -8\sin t$
 $\Rightarrow a(t) = x''(t) = -8\cos t$

(b) The mass at time $t = \frac{5\pi}{6}$ has position $x\left(\frac{5\pi}{6}\right) = 8\cos\frac{5\pi}{6} = -4\sqrt{3}$, velocity $v\left(\frac{5\pi}{6}\right) = -8\sin\frac{5\pi}{6} = -4$, and acceleration $a\left(\frac{5\pi}{6}\right) = -8\cos\frac{5\pi}{6} = 4\sqrt{3}$. Since $v\left(\frac{5\pi}{6}\right) < 0$, the particle is moving to the left.