Velocity, speed, and acceleration

3.6.1

(a)

$$v(t) = x'(t) = 5 - 2t$$

$$a(t) = x''(t) = -2$$

(b)

At the farthest x coordinate, the particle will stop and change direction:

$$v(t) = 5 - 2t = 0 \quad \Rightarrow \quad t = \frac{5}{2}$$

$$x\left(\frac{5}{2}\right) = \frac{25}{4}$$

(c)

$$v(1) = 3 \qquad \text{positive velocity, therefore moving to right}$$

$$v(3) = -1 \qquad \text{negative velocity, therefore moving to left}$$

(d)

$$v(1) = 3 > 0; \quad a(1) = -2 < 0 \qquad \text{acceleration opposite to velocity, therefore slowing down}$$

$$v(3) = -1 < 0; \quad a(3) = -2 < 0 \qquad \text{acceleration in the same direction as velocity, therefore speeding up}$$