Position of a particle \( y = \sqrt{3t+1} \)

a) Velocity after 1 sec

\[ v(t) = \frac{dy}{dt} = \frac{1}{2} (3t+1)^{-\frac{1}{2}} (3) \]

\[ v(1) = \frac{1}{2} (3(1)+1)^{-\frac{1}{2}} (3) = \frac{3}{4} \]

b) Acceleration after 1 sec

\[ a(t) = \frac{d^2y}{dt^2} = \frac{3}{2} (-\frac{1}{2})(3t+1)^{-\frac{3}{2}} (3) \]

\[ a(1) = \frac{3}{2} (-\frac{1}{2})(3(1)+1)^{-\frac{3}{2}} (3) = -\frac{9}{8} \]

c) \( y'(t) = 0 \)

\[ y'(t) = \frac{1}{2} (3t+1)^{-\frac{1}{2}} (3) \]

\[ y'(t) = \frac{3}{2\sqrt{3t+1}} = 0 \]

\[ 3 \neq 0 \]

The particle is never stationary.
Position of a particle \( y = \sqrt[3]{3t+1} \)

a) Velocity after 1 sec

\[ v(t) = y' = \frac{1}{6} (3t+1)^{-\frac{3}{2}} \]

\[ v(1) = \frac{1}{6} (3(1)+1)^{-\frac{3}{2}} = \frac{-1}{3} \]

b) Acceleration after 1 sec

\[ a(t) = y'' = \frac{1}{2} (3t+1)^{-\frac{3}{2}} \]

\[ a(1) = \frac{1}{2} (3(1)+1)^{-\frac{3}{2}} = -\frac{1}{3} \]

c) When is it stationary?

\[ y'(t) = 0 \]

\[ y'(t) = \frac{3}{2} \cdot \frac{1}{\sqrt[3]{3t+1}} = 0 \]

\[ 3 \neq 0 \]

particle is never stationary