2. A particle starts at point \( A \) on the positive \( x \)-axis at time \( t = 0 \) and travels along the curve from \( A \) to \( B \) to \( C \) to \( D \), as shown above. The coordinates of the particle's position \((x(t), y(t))\) are differentiable functions of \( t \), where \( x'(t) = \frac{dx}{dt} = -9\cos\left(\frac{\pi t}{6}\right)\sin\left(\frac{\pi\sqrt{t} + 1}{2}\right) \) and \( y'(t) = \frac{dy}{dt} \) is not explicitly given. At time \( t = 9 \), the particle reaches its final position at point \( D \) on the positive \( x \)-axis.

(a) At point \( C \), is \( \frac{dy}{dt} \) positive? At point \( C \), is \( \frac{dx}{dt} \) positive? Give a reason for each answer.
(b) The slope of the curve is undefined at point \( B \). At what time \( t \) is the particle at point \( B \)?
(c) The line tangent to the curve at the point \((x(8), y(8))\) has equation \( y = \frac{5}{9} x - 2 \). Find \( \frac{dx}{dt} \) and \( \frac{dy}{dt} \) at this point.
(d) How far apart are points \( A \) and \( D \), the initial and final positions, respectively, of the particle?