2023 AP Daily: Practice Sessions

AP Calculus AB

Session 6 – FRQ (Calculator Active)

A particle, P, is moving along the y-axis. The velocity of particle P is given by $v(t) = (t^2 + 0.2t - 3)^{\frac{2}{3}} - t$ for $t \geq 0$. At time $t = 0$, particle P is at position $y = -1$.

a. Find the acceleration of particle P at time $t = 1.3$.

b. Is the speed of particle P increasing or decreasing at time $t = 1.3$? Explain your reasoning.

c. Find the position of particle P at time $t = 1.3$. Is particle P moving towards or away from the origin at time $t = 1.3$? Explain your reasoning.

d. A second particle, Q, is also moving along the y-axis with position given by $Q(t) = \frac{1}{12}t^2 + t$. What is the first time for $t > 0$ that particles P and Q have the same velocity?

All problems written by Mark & Virge