

Particle calculator problem 2016 2

AP Calculus

Calculator problem

For $t \geq 0$, a particle moves along the x -axis. The velocity of the particle at time t is given by

$v(t) = 1 + 2 \sin\left(\frac{t^2}{2}\right)$. The particle is at position $x = 2$ at time $t = 4$.

- (a) At time $t = 4$, is the particle speeding up or slowing down?
- (b) Find all times t in the interval $0 < t < 3$ when the particle changes direction. Justify your answer.
- (c) Find the position of the particle at time $t = 0$.
- (d) Find the total distance the particle travels from time $t = 0$ to time $t = 3$.