AP Calculator Practice

A particle moves along the x-axis on the interval [0, 3]. The velocity of the particle is given by $v(t) = \sin\left(\frac{2e^t}{5}\right)$. The position of the particle at t = 0 is 4.

a. At what time(s) does the particle change direction?

b. Find the velocity and acceleration at t = 2.3.

c. Is the velocity increasing or decreasing at t =2.3? Justify.

d. Is the speed increasing or decreasing at t =2.3? Justify.

e. Find the total distance traveled on the interval [0, 3].

f. Find the average velocity of the particle on the interval [0, 3].

g. Find the position of the particle at t = 3.

h. On [0, 3], find the time and position of the particle when it is furthest to the right. Justify.

Answers

a. 2.061, 2.754
b. v(2.3) = -0.750; a(2.3) = -2.639
c. velocity decreasing
d. speed increasing
e. 2.050
f. 0.394
g. 5.182
h. position 5.455 at t = 2.061

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