

2012 AP[®] CALCULUS AB FREE-RESPONSE QUESTIONS

6. For $0 \leq t \leq 12$, a particle moves along the x -axis. The velocity of the particle at time t is given by $v(t) = \cos\left(\frac{\pi}{6}t\right)$. The particle is at position $x = -2$ at time $t = 0$.
- (a) For $0 \leq t \leq 12$, when is the particle moving to the left?
 - (b) Write, but do not evaluate, an integral expression that gives the total distance traveled by the particle from time $t = 0$ to time $t = 6$.
 - (c) Find the acceleration of the particle at time t . Is the speed of the particle increasing, decreasing, or neither at time $t = 4$? Explain your reasoning.
 - (d) Find the position of the particle at time $t = 4$.
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STOP

END OF EXAM