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?

   (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.