AP® CALCULUS AB FREE-RESPONSE QUESTIONS
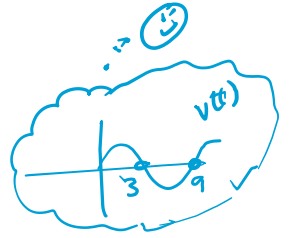
6. For $0 \le t \le 12$, a particle moves along the x-axis. The velocity of the particle at time t is given by $v(t) = \cos\left(\frac{\pi}{6}t\right)$. The particle is at position $x = -2$ at time $t = 0$.

(a) For $0 \le t \le 12$, when is the particle moving to the left?

(c) ~~Find the acceleration of the particle at time~~. Is the speed of the particle increasing, decreasing, or neither at time $t = 4$? Explain your reasoning.

a) Particle is moving to the left on $(3,9)$ b/c $v(t) < 0$ on $(3,9)$

b) $v(4) = -0.5$

$a(4) = v'(4) = -0.453$

Speed of the particle is inc b/c $v(4) < 0$ and $a(4) < 0$