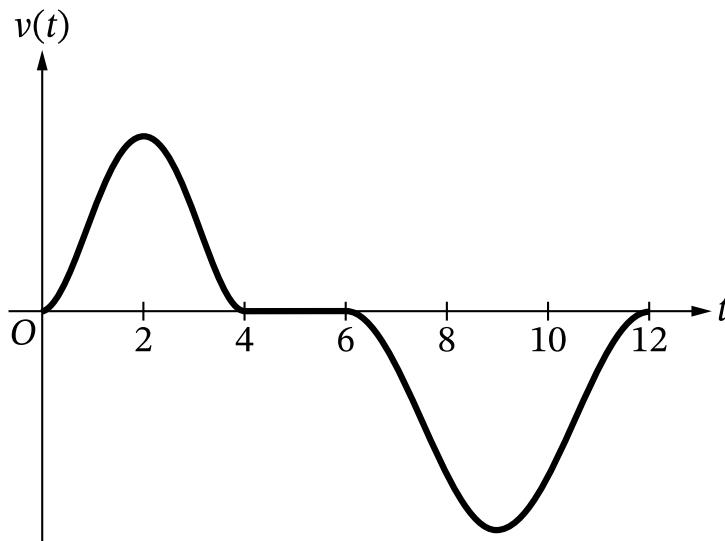


5. A remote-controlled toy car moves back and forth along a straight path so that its velocity at time t is given by the function v , where $v(t)$ is measured in feet per second and t is measured in seconds.

$$v(t) = \begin{cases} t^4 - 8t^3 + 16t^2 & \text{for } 0 \leq t \leq 4 \\ 0 & \text{for } 4 < t < 6 \\ 10 \cos\left(\frac{\pi}{3}t\right) - 10 & \text{for } 6 \leq t \leq 12 \end{cases}$$

The graph of $v(t)$ is shown.



Part A

Find the acceleration of the car at time $t = 1$ second. Show the work that leads to your answer.

Part B

Is the car speeding up or slowing down at time $t = 1$ second? Give a reason for your answer.

Part C

Find the distance, in feet, that the car traveled over the time interval $0 \leq t \leq 4$ seconds. Show the work that leads to your answer.

Part D

Find the average velocity of the car over the time interval $6 \leq t \leq 12$ seconds. Show the work that leads to your answer.