

Graph of $v(t)$

1. Beware of the zombie apocalypse!
A zombie starts at its home at time $t=0$ and shambling and lurches along a straight path towards your home. For $[0, 24]$ minutes, the zombie's velocity is modeled by the piecewise function above.
 - a.) Write the equation for the piecewise graph (yes this is not calculus but algebra).
 - b.) At what values of t does the zombie change direction? Justify your answer. (do not estimate....use your equation to find the intercept)
 - c.) When is the zombie's acceleration equal to 0? Justify your answer.
 - d.) If $s(4) = 50$ (the zombie's position), write an equation for a tangent line at $t=4$ to the position graph.

e.) Use the tangent line above to estimate the zombie's position at $t=4.5$.

f.) Is the zombie's speed increasing or decreasing at $t=1$? At $t=17$? Justify your answers.

2. A particle moves along the x-axis so that its position at any time $t \geq 0$ is given by $x(t) = x^3 - 6x^2 + 12x + 4$.

(a) Determine $v(t)$.

(b) Determine the interval(s) on which the particle is moving right.

(c) Determine $a(t)$

(d) Determine the interval(s) on which the speed is increasing.

(e) Determine the interval(s) where the speed is decreasing.

3. A particle moves along the x-axis so that its velocity at any time $t \geq 0$ is given by $v(t) = 3t^2 - 16t + 5$. $v(t)$ is measured in ft/sec.
- a.) For $t \geq 0$ determine intervals on which the particle is moving left. Show the analysis that leads to your conclusion.

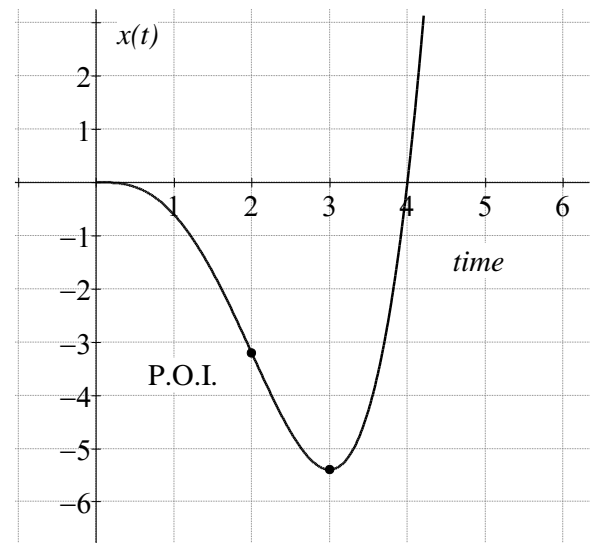
b.) Determine the acceleration of the particle at $t = 1$ sec . Show your work.

c) When is the particle speeding up? When is it slowing down?

4. Given the graph of the position function of a particle moving on the x-axis where t is measured in seconds and $x(t)$ is the x-coordinate measured in inches, answer the following. $0 \leq t \leq 4.2$

(a) When is the particle moving right? Explain.

(b) When is the particle moving left? Explain.



(c) Determine the time(s), t , when the particle's velocity is zero.

(d) When do you think the particle is farthest to the left? Why?