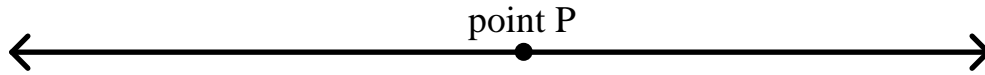


Advanced Challenge Level 2 Problem #12

The diagram below shows a horizontal line with a fixed point P. Another point (not shown) moves on this line for ten seconds. The function $s = f(t) = 0.5t^2 - 4t + 6$ represents the distance, s , in inches, that the moving point is from point P. t represents the time in seconds that the point has been moving where $0 \leq t \leq 10$. It is understood that if $s > 0$, then the moving point is to the right of point P, and if $s < 0$, then the moving point is to the left of point P.



1. Write a function for the velocity of the moving point. $v =$ _____
2. What is the position and the velocity of the moving point when $t = 0$ seconds?
3. What is the position and the velocity of the moving point when $t = 4$ seconds?
4. What is the position and the velocity of the moving point when $t = 10$ seconds?
5. What is the average velocity of the moving point from $t = 0$ seconds to $t = 4$ seconds?
6. Find a value of t between 0 and 4 when the velocity of the moving point is equal to the average velocity you found in question # 5.
7. What is the average velocity of the moving point from $t = 4$ seconds to $t = 10$ seconds?
8. Find a value of t between 4 and 10 when the velocity of the moving point is equal to the average velocity you found in question # 7.
9. What is the average velocity of the moving point from $t = 0$ seconds to $t = 10$ seconds?
10. Find a value of t between 0 and 10 when the velocity of the moving point is equal to the average velocity you found in question # 9.
11. Write an algebraic expression for the average velocity of the moving point from $t = a$ seconds to $t = b$ seconds where $0 \leq a < b \leq 10$.
12. Represent, in terms of a and b , a value of t between a and b when the velocity of the moving point is equal to the average velocity you found in question # 11.