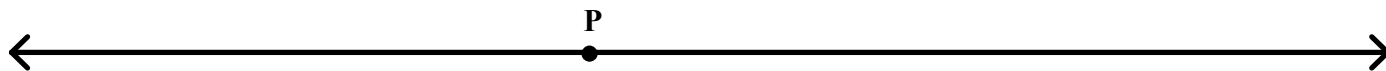


## Calculus Worksheet #9 Unit 1 Selected Solutions

A object moves on the line below in such a way that its distance,  $s$  (in inches), from point  $P$  after  $t$  seconds is given by the function

$$s = f(t) = 0.25t^2 - 2t + 3, \text{ where } t \geq 0.$$

(Assume that  $s > 0$  when the object is to the right of point  $P$  and  $s < 0$  when the object is to the left of point  $P$ .) Answer the following questions.



8. Write a function for the velocity of the object in terms of  $t$ .

$$v = f'(t) = .5t - 2$$

9. When is the object at point  $P$ ? There are two times.

Find  $t$  when  $s = 0$ .

$$0.25t^2 - 2t + 3 = 0$$

$$t^2 - 8t + 12 = 0$$

$$(t - 2)(t - 6) = 0$$

$$t = 2 \text{ or } t = 6$$

The object is at point  $P$  when  $t = 2$  seconds  
and again when  $t = 6$  seconds.

10. What is the velocity of the particle at each time it is at point  $P$ ?

When  $t = 2$ ,  $v = f'(2) = -1$ .

When  $t = 6$ ,  $v = f'(6) = +1$ .

When  $t = 2$  seconds, the object is moving  
to the left at 1 inch per second.

When  $t = 6$  seconds, the object is moving  
to the right at 1 inch per second.

11. When is the object at rest?

Find  $t$  when  $v = 0$ .

$$.5t - 2 = 0$$

$$t = 4$$

The object is at rest when  $t = 4$  seconds.

12. Describe the position of the object when it is at rest.

position =  $f(4) = -1$

The object is at rest at a point that  
is 1 inch to the left of point  $P$ .