9.4 Net Change

Calculus Name: _____ **CA #1**

1. Mr. Sullivan can paint his tricycles at a rate of $r(t) = 50 - \frac{t}{2}$ square inches per minute, where t is the number of hours since he started painting.
   a. Find $\int_0^5 r(t)\,dt$

   b. Explain the meaning of your answer to part a in the context of this problem.

2. Mr. Brust leaves for a bike ride at 10:00 a.m. (time $t = 0$) and rides with velocity $v(t) = 20 - \frac{t}{5}$ miles per hour, where t is the number of hours since he started riding
   a. Find $\int_1^2 r(t)\,dt$

   b. Explain the meaning of your answer to part a in the context of this problem.

3. A particle's velocity along the x-axis is given by $v(t) = 5\cos t$.
   (a) Find the particle's displacement on the interval $0 \le t \le \frac{3\pi}{2}$.

   (b) If $s(0) = 3$, what is the particles position at $t = \frac{3\pi}{2}$?

4. A particle's velocity is given by $v(t) = 20 - 8t$, where t is measured in weeks, v is measured in inches per week, and $s(t)$ represents the particle's position.
   (a) If $s(0) = 3$, what is the value of $s(3)$?

   (b) What is the net change in distance over the first 10 weeks?

   (c) What is the total distance traveled by the particle during the first 10 weeks? Show the set up AND your work.

5. A particle's velocity is given by $v(t) = e^{\sin t}\cos t$, where t is measured in months, v is measured in yards per month, and $s(t)$ represents the particle's position.
   (a) If $s(0) = 5$, what is the value of $s(2\pi)$?

   (b) What is the net change in distance over the first 8 months?

   (c) What is the total distance traveled by the particle during the first 8 months? Show the set up.

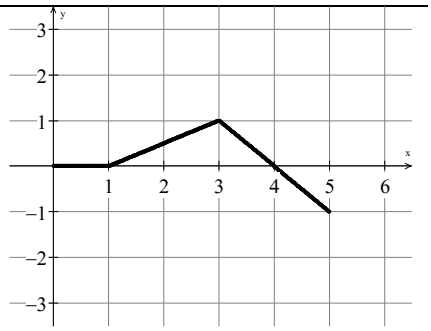
6. $f'(x) = \sin x$ and $f(0) = 2$. What is the value of $f(\pi)$??

7. $f'(x) = x^2 - 2x$ and $f(-3) = 4$. What is the value of $f(1)$?

8. $f'(x) = 6 - x$ and $f(5) = -7$. What is the value of $f(2)$?

9. $f'(x) = 2x + 3x^2 - 1$ and $f(1) = 2$. What is the value of $f(5)$?

10. The graph to the right shows the velocity of an object moving along the x-axis over a 5-second period.

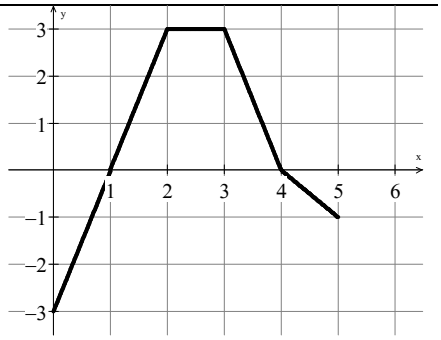


a) If the objected started 2 meters to the left, where is the object after 3 seconds?

b) If the objected started 2 meters to the left, where is the object after 5 seconds?

c) Find the total distance traveled by the object over the 5-second period.

11. The graph to the right shows the velocity of an object moving along the x-axis over a 5-second period.



a) If the object started 10 meters to the right, where is the object after 3 seconds?

b) Find the total distance traveled by the object over the 5-second period

Answers to 9.4 CA #1

1a. 243.75 1b. During the first 5 hours, Sully painted 243.75 square inches.		2a. 19.7 2b. During the 2nd hour, Brust rode 19.7 miles.			3a. 5 units to the left. 3b. 2 units to the left.	4a. 27 4b. −200 inches 4c. 250 inches
5a. 5 5b. 1.6895 yards 5c. 6.4478 yards	6. 4	7. $21\frac{1}{3}$	8. $-\frac{29}{2}$	9. 146	10a. 1 meter to the left. 10b. 1 meter to the left. 10c. 2 meters.	11a. 13 meters to the right. 11b. 8 meters