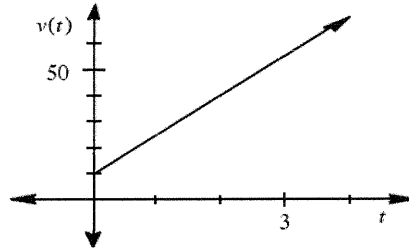


AP Calculus – Additional Semester 1 Review Problems

While driving to work, Mr. Matlack's velocity was $v(t) = 15t + 10$, where t is hours and $v(t)$ is miles per hour. Determine how far Mr. Matlack lives from school if it takes him:

- 1 hour to get to work.
- 4 hours to get to work.
- $\frac{1}{2}$ hour to get to work.
- t hours to get to work.



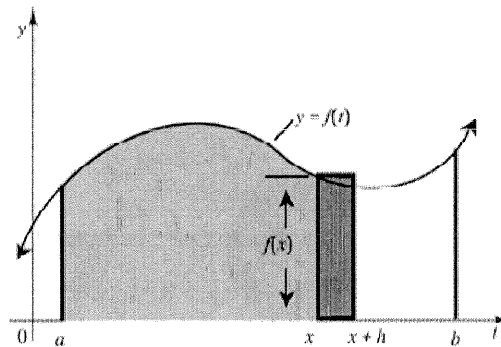
Now examine $A'(x)$ analytically.

If $A(x) = \int_c^x f(t) dt$ then:

$$A'(x) = \frac{d}{dx} \int_c^x f(t) dt$$

$$A'(x) = \frac{d}{dx} (F(x) - F(c))$$

$$A'(x) = \frac{d}{dx} (F(x)) - \frac{d}{dx} (F(c))$$



How can we further simplify $\frac{d}{dx} (F(x)) - \frac{d}{dx} (F(c))$?

Use the Fundamental Theorem of Calculus to evaluate each expression and compare the results.

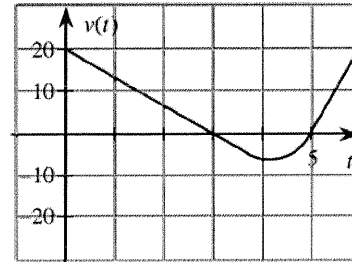
a. $\frac{d}{dx} \int_3^x (3x - 5) dx$

b. $\int_3^x \frac{d}{dx} (3x - 5) dx$

c. $\frac{d}{dx} \int_3^5 (3x - 5) dx$

d. $\int \frac{d}{dx} (3x - 5) dx$

The graph at right shows the velocity (in miles per hour) of a car during a road trip. At time $t = 0$, the car was on the Golden Gate Bridge heading north.



- Find a function for $v(t)$.
- How far north has the car traveled at 3 hours?
At 4 hours?
- Explain what happened to the car between $3 \leq t \leq 5$ hours.
- Set up an integral to represent the displacement from $0 \leq t \leq 5$.
- Set up an integral to represent the total distance from $0 \leq t \leq 5$.