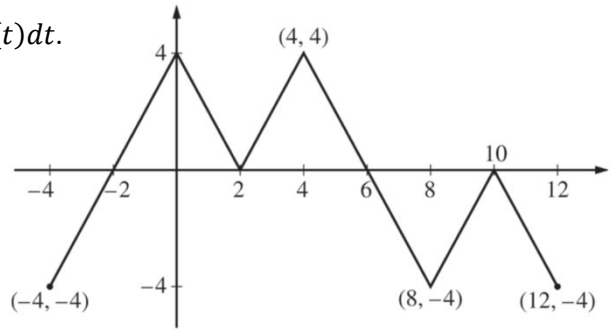
Using the Fundamental Theorem and Properties of Definite Integrals

1. Find $\frac{dy}{dx}$ for each.
   a. $y = \int_{-2}^{x} 5t^{t+2}dt$, $\frac{dy}{dx}$ =
   b. $y = \int_{8}^{x} \sqrt{2 + e^{3t}}dt$, $\frac{dy}{dx}$ =
   c. $y = \int_{1009}^{2000} \frac{\sin 4t}{\sqrt[3]{\ln t}}dt$, $\frac{dy}{dx}$ =

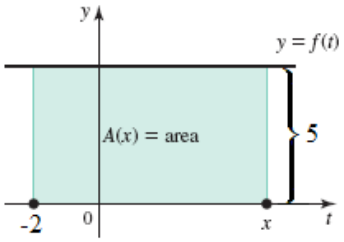
2. The graph of $f(t)$ is shown below. Let $h(x) = \int_{-2}^{x} f(t)dt$.



Graph of f

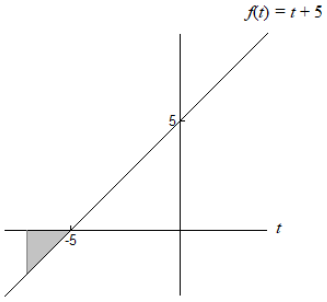
   a. Find $h(2)$.
   b. Find $h(8)$.
   c. Find $h'(6)$.
   d. Find $h'(x)$.
   e. Evaluate $\int_{-2}^{2}(f(t) + 10)dt$.

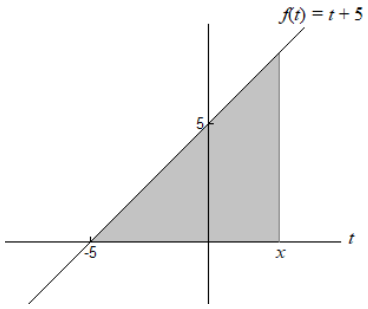
3. Let $A(x) = \int_{-2}^{x} f(t)dt$ for f(t) = 5.



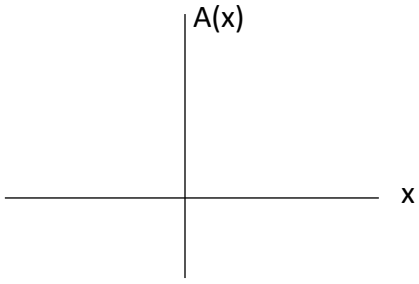
   a. Use geometry to find a formula for A(x) without integrals.
   b. Find A'(x)

4. Let $A(x) = \int_{-5}^{x} f(t)dt$ for f(t) = t + 5.





   a. Use geometry to find A(−7)
   b. Use geometry to find a formula for A(x) without integrals. Sketch a graph of A(x) on the axes provided.



   c. Find A'(x)
   d. Report the coordinates of any extrema for A(x).