

4. (12 points) Suppose that $h(x)$ is a continuous function. Suppose also that $H(x)$ is an antiderivative of $h(x)$.

(a) (3 pts.) In *one short sentence*, what can you say about the relationship between $H(x)$ and $\int_a^x h(t) dt$?

(b) (3 pts.) Calculate $\frac{d}{dx} \int_a^x h(t) dt$.

(c) (3 pts.) Calculate $\frac{d}{dx} \left(\int_a^b h(x) dx \right)$.

(d) (3 pts.) Calculate $\int_a^b \left(\frac{d}{dx} h(x) \right) dx$.