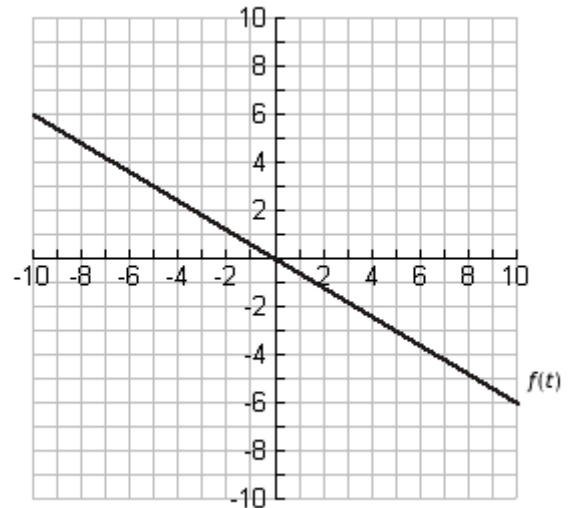


Calculus, Investigation 5.4 #1

Consider the function $f(t)$ shown in the graph to the right.



1. Find $\int_{-5}^{-5} f(t)dt$.

2. Find $\int_{-5}^0 f(t)dt$.

3. Find $\int_{-5}^{10} f(t)dt$.

4. Find $\int_{-5}^x f(t)dt$ where $x = 4$.

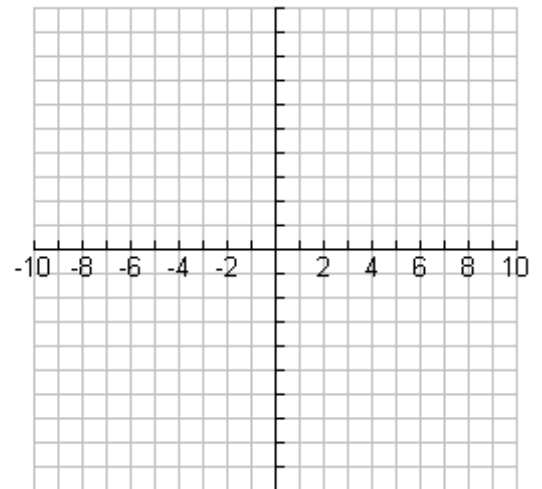
5. Find $\int_{-5}^x f(t)dt$ where $x = 8$.

6. Create a table of values to show how $\int_{-5}^x f(t)dt$ varies with respect to x .

x	$\int_{-5}^x f(t)dt$

7. Since the upper bound of $\int_{-5}^x f(t)dt$ could be many different values, the variable x is appropriate. Explain why two different letters must be used in such an integral. That is, why is it incorrect to write $\int_{-5}^x f(x)dx$?

8. Since the integral can have different values for the upper bound, consider the function $h(x) = \int_{-5}^x f(t)dt$. Sketch a graph of $h(x)$ from your table of values. Add more values as you see fit.



9. What kind of function do you think $h(x)$ is from looking at the graph of $h(x)$?

10. Looking at the graph of $h(x)$, where is its maximum? Explain how the graph of $f(t)$ supports this.

11. Looking at your graph of $h(x)$, does it appear that $h(-10)$ will be positive or negative? Explain how that fits with the graph of $f(t)$.
12. Consider the function $k(x) = \int_{-10}^x f(t)dt$ for the same function $f(t)$ graphed above. How will the graphs of $k(x)$ and $h(x)$ compare? Why?
13. Consider the function $g(x) = \int_5^x f(t)dt$ for the same function $f(t)$ graphed above. How will the graphs of $g(x)$ and $h(x)$ compare? Why?
14. For a general function $h(x) = \int_a^x f(t)dt$ where $f(t)$ is any continuous function and a is a constant, explain how you think changes in a will affect the graph of $h(x)$.