

I-A7b

PRACTICE

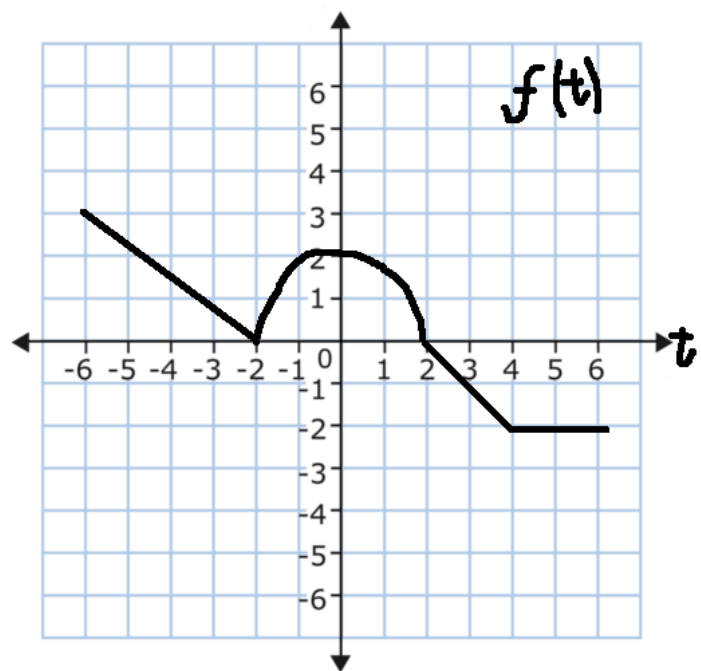
1. It's 10am and Frank has already used 8 mb of data on his cell phone. From 10am to midnight ( $t=24$ ), his data usage rate can be modeled by the differentiable function  $f(t) = \sin\left(\frac{\pi}{8}t\right) + 1$  mb/hr. Write an equation that includes an integral that will give the amount of data Frank has used as of midnight. Then, find that amount and include units in your answer.

I-U9

The function  $f(t)$  is shown over  $[-6,6]$  and consists of line segments and a semicircle.

Let  $G(x) = \int_{-6}^x f(t) dt$

2. Find  $G(0)$ ,  $G'(0)$ , and  $G''(0)$ .
3. Find  $G(x)$  relative maxima, if any, over  $[-6,6]$ . Justify your answer.



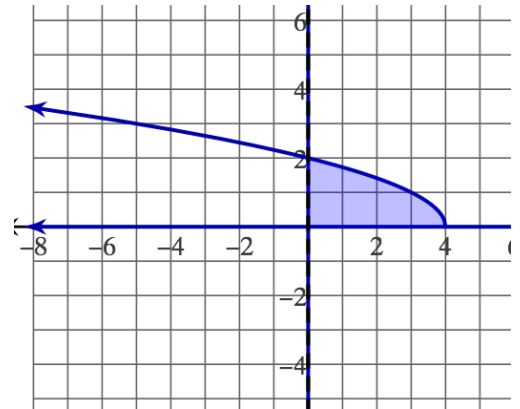
4. Find any points of inflection of  $G(x)$ . Justify.

I-U6

5. The FTC states: If  $f(x) = \int_a^x g(t) dt$ , then  $f'(x) = \frac{d}{dx} f(x) = \frac{d}{dx} \int_a^x g(t) dt = g(x)$ . Explain this in your own words.

I-A5a

6. Consider the region bound by  $y = \sqrt{4-x}$  and the x and y axes. Set up an integral and then find the volume of the solid generated by revolving this region about the y-axis.



I-A5b

7. Consider the region between  $y = x^2 - 2$  and  $y = \sqrt{x} - 2$ . Find the volume of the solid generated by revolving this region around the line  $y=2$ .

