

4. [9 points] On the axes provided below, sketch the graph of a single function  $j(x)$  that satisfies all of the following conditions.

- The domain of the function  $j(x)$  includes  $-6 < x < 9$ .
- On  $-6 < x < 0$ , the function  $j(x)$  is the derivative of the function  $m(x)$ , which is shown in the graph to the right. Note that  $m(x)$  is linear for  $-6 < x < -5$  and is constant for  $-1 < x < 0$ .
- $j(x)$  is continuous on  $0 < x < 5$ .
- $j(x)$  is increasing and concave down on  $0 < x < 3$ .
- The average rate of change on  $[3, 5]$  is  $-\frac{1}{2}$ .
- $\lim_{x \rightarrow 6^-} j(x)$  does not exist.
- $j(6) = -3$ .
- The instantaneous rate of change of  $j(x)$  at  $x = 8$  is 2.

