

7. [3 points] Assume that  $k(t)$  is a differentiable function defined for all  $t$ , and that the tangent line to the graph of  $k(t)$  at  $t = 2$  passes through the points  $(1, 10)$  and  $(4, 19)$ . Find the values of  $k(2)$  and  $k'(2)$ . You do not need to show work, but limited partial credit may be earned for work shown.

*Solution:* The slope of the tangent line is equal to  $\frac{19-10}{4-1} = \frac{9}{3} = 3$ , so this is  $k'(2)$ . Then the tangent line must pass through  $(2, 13)$ , which means we must have  $k(2) = 13$ .

**Answer:**  $k(2) =$  13 and  $k'(2) =$  3

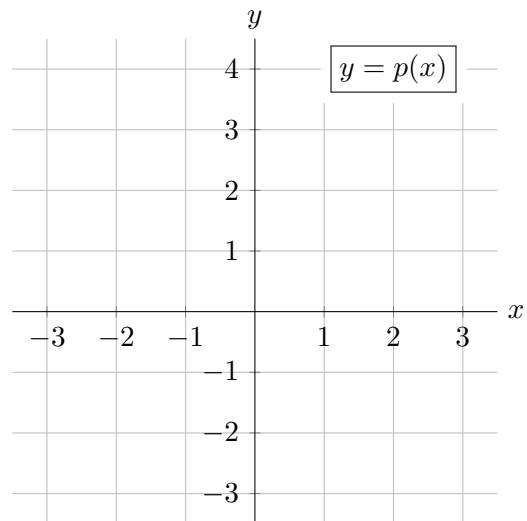
8. [5 points] For each part below, carefully draw the graph of a single function on the given axes that satisfies the given conditions, or, if no such function exists, write DNE.

a. [2 points]

A function  $p(x)$  such that

- $p(x)$  is defined for all  $-3 < x < 3$ ,
- $\frac{p(2) - p(-2)}{2 - (-2)} = 0$ , and
- $p(x)$  is invertible.

*Solution:* DNE, because we must have  $p(2) = p(-2)$  and so  $p(x)$  does not pass the horizontal line test.



b. [3 points]

A function  $q(x)$  such that

- $q(x)$  is defined for all  $-3 < x < 3$ ,
- $q(x)$  is increasing on  $(-3, 3)$ ,
- $q(x)$  is concave up on  $(-3, 0)$ , and
- $q(x)$  is an odd function.

