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.

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

**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.

   \[ \text{a. [2 points]} \]
   A function $p(x)$ such that
   \[ \text{• } p(x) \text{ is defined for all } -3 < x < 3, \]
   \[ \text{• } \frac{p(2) - p(-2)}{2 - (-2)} = 0, \text{ and} \]
   \[ \text{• } p(x) \text{ is invertible.} \]

\[ \text{Solution: } \text{DNE, because we must have } p(2) = p(-2) \text{ and so } p(x) \text{ does not pass the horizontal line test.} \]

   \[ \text{b. [3 points]} \]
   A function $q(x)$ such that
   \[ \text{• } q(x) \text{ is defined for all } -3 < x < 3, \]
   \[ \text{• } q(x) \text{ is increasing on } (-3, 3), \]
   \[ \text{• } q(x) \text{ is concave up on } (-3, 0), \text{ and} \]
   \[ \text{• } q(x) \text{ is an odd function.} \]

©2022 Univ of Michigan Dept of Mathematics
Creative Commons BY-NC-SA 4.0 International License