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**

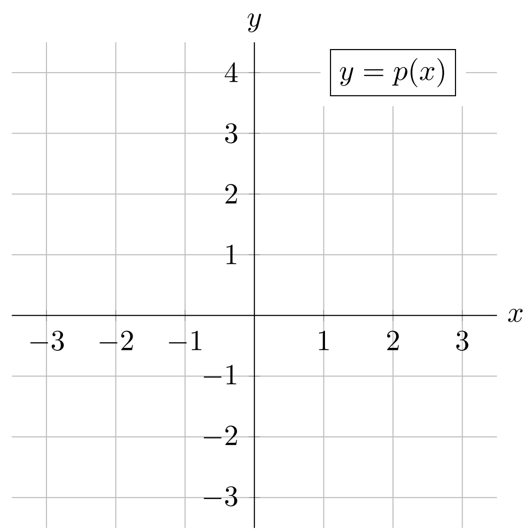
8. [5 points] For each part below, carefully draw the graph of a single function on the given axes that satisfies the given conditions, or, if no such function exists, write DNE.

a. [2 points]

A function $p(x)$ such that

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