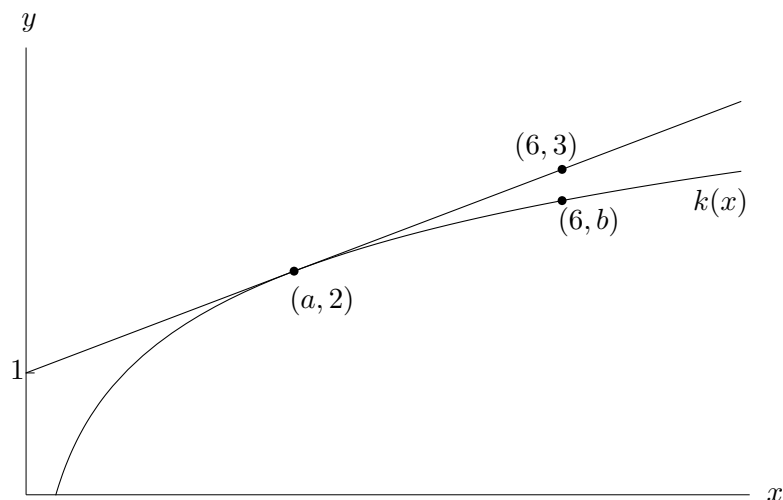


5. [10 points] The figure below shows the graph a function $k(x)$ and its tangent line at a point $(a, 2)$. The average rate of change of $k(x)$ between $x = a$ and $x = 6$ is $1/6$.



Find **exact** numerical values for the following. If it is not possible to find a value, write “NP”. You do not need to show your work.

- a. [2 points]

$$a = \underline{\quad 3 \quad}$$

Solution: The slope of the tangent line is $\frac{1}{3}$ and its y -intercept is 1, so its equation is $y = \frac{1}{3}x + 1$. Since $(a, 2)$ lies on the tangent line, $a = 3$.

- b. [2 points]

$$b = \underline{\quad 5/2 \quad}$$

Solution: We know that the average rate of change between $x = a$ and $x = 6$ is $1/6$. This is the slope of the secant line connecting $(3, 2)$ and $(6, b)$. After some algebra we obtain $b = \frac{5}{2}$.

- c. [2 points]

$$k'(2) = \underline{\quad \text{NP} \quad}$$

Solution: We cannot find $k'(2)$ (the y -coordinate of the given point is 2, not the x -coordinate).

- d. [2 points]

$$k'(a) = \underline{\quad 1/3 \quad}$$

Solution: This is the slope of the tangent line, which is $\frac{1}{3}$.

- e. [2 points]

$$k'(6) = \underline{\quad \text{NP} \quad}$$

Solution: We cannot find $k'(6)$ since the given line is not tangent to the graph when $x = 6$ (and the statement about average change refers to a secant line, not a tangent line).