Math 105 Quiz 2
§1.4-§1.7
Name: Key
Show all work for credit.

1. Sketch the graph of a function \( f \) for which \( f(x) < 0 \), \( f'(x) < 0 \), and \( f''(x) < 0 \) for all \( x \). Describe what these inequalities mean in words.

\[
\begin{align*}
 f(x) < 0 & \Rightarrow \text{function has negative values} \\
 f'(x) < 0 & \Rightarrow \text{derivative is negative} \Rightarrow \text{function is decreasing} \\
 f''(x) < 0 & \Rightarrow \text{2nd derivative is negative} \Rightarrow \text{function is concave down}
\end{align*}
\]

2. Given the following graph of \( g \) estimate \( g'(-1) \) using the techniques in §1.5. Find the equation of the tangent line through \( x = -1 \).

\[
\begin{align*}
g'(-1) & \approx \frac{10-0}{-1 \frac{1}{5} - 0} = -\frac{25}{3} \\
y - 8 & = -\frac{25}{3} (x + 1)
\end{align*}
\]
3. Match the graphs on the left to the graphs of their derivatives on the right. Briefly explain.

- Function had horizontal tangent lines occur twice in interval.
- Decreasing positive slope throughout function.
- Function had constant slope and undefined at zero.