

Name: _____

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There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

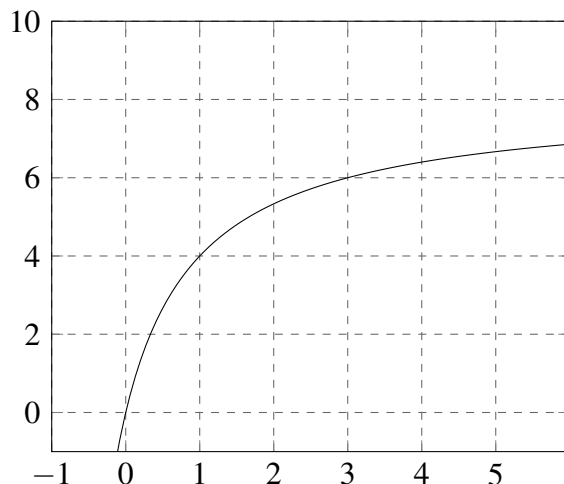
1. [11 points] Let $P(3,6)$ be a point on the graph of $f(x) = \frac{8x}{x+1}$.

- Find the slope of the secant line passing through P and the point $Q(0, f(0))$.
- Find the slope of the secant line passing through P and the point $Q(1, f(1))$.
- The table below lists the slope of the secant line passing through the point P and the point $Q(x, f(x))$ for several values of x .

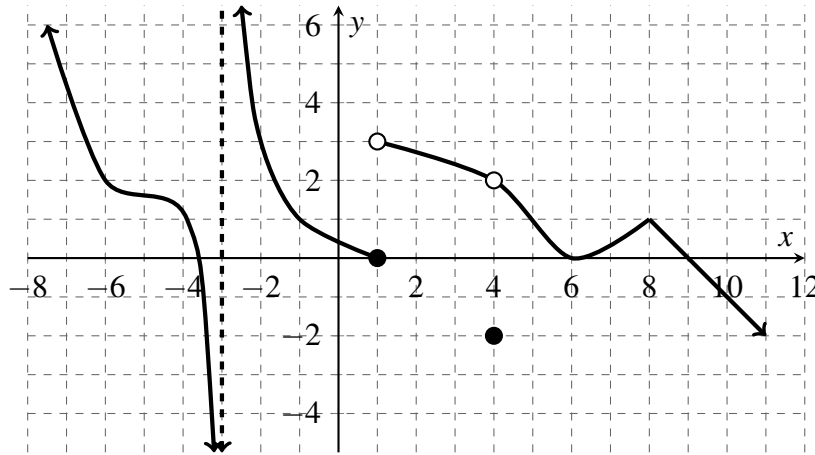
x	2.9	2.99	2.999	3.001	3.01	3.1
$f(x)$	5.9487	5.99498	5.99499	6.00049	6.00498	6.04870
m_{sec}	0.51282	0.50123	0.50012	0.49987	0.49875	0.48780

Use the information in the table to estimate the slope of the tangent line to $f(x)$ at the point $P(3,6)$.

- Use the slope from part (c) above to write an equation of the tangent line at point P .
- Below is a sketch of the graph of $f(x) = \frac{8x}{x+1}$. Sketch the tangent line to the graph at the point P .



2. [9 points] Use the graph of the function of $f(x)$ to answer the following questions. Give the most complete answer; if the limit is infinite, indicate that with ∞ or $-\infty$. If a value does not exist, write DNE.



- a. $f(1) = \underline{\hspace{2cm}}$ b. $f(4) = \underline{\hspace{2cm}}$ c. $f(8) = \underline{\hspace{2cm}}$
- d. $\lim_{x \rightarrow -3^+} f(x) = \underline{\hspace{2cm}}$ e. $\lim_{x \rightarrow -3} f(x) = \underline{\hspace{2cm}}$ f. $\lim_{x \rightarrow 1^+} f(x) = \underline{\hspace{2cm}}$
- g. $\lim_{x \rightarrow 1} f(x) = \underline{\hspace{2cm}}$ h. $\lim_{x \rightarrow 4} f(x) = \underline{\hspace{2cm}}$ i. $\lim_{x \rightarrow 8} f(x) = \underline{\hspace{2cm}}$

3. [5 points] On the axes below, sketch a graph satisfying **all** of the properties listed below.

$$\lim_{x \rightarrow 2^-} f(x) = 3, \quad \lim_{x \rightarrow 2^+} f(x) = 1, \quad f(2) = 1, \quad \lim_{x \rightarrow 4} f(x) = 2, \quad f(4) = 5$$

