Name: _____ _____ / 25

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 $f(x) = \dfrac{8x}{x+1}$.

a. Find the slope of the secant line passing through P and the point $Q(0, f(0))$. $= (0,0)$

$$m = \frac{\Delta y}{\Delta x} = \frac{6-0}{3-0} = 2$$

b. Find the slope of the secant line passing through P and the point $Q(1, f(1))$. $= \left(1, \frac{8}{2}\right) = (1,4)$

$$m = \frac{\Delta y}{\Delta x} = \frac{6-4}{3-1} = \frac{2}{2} = 1$$

c. 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

$\frac{1}{2}$

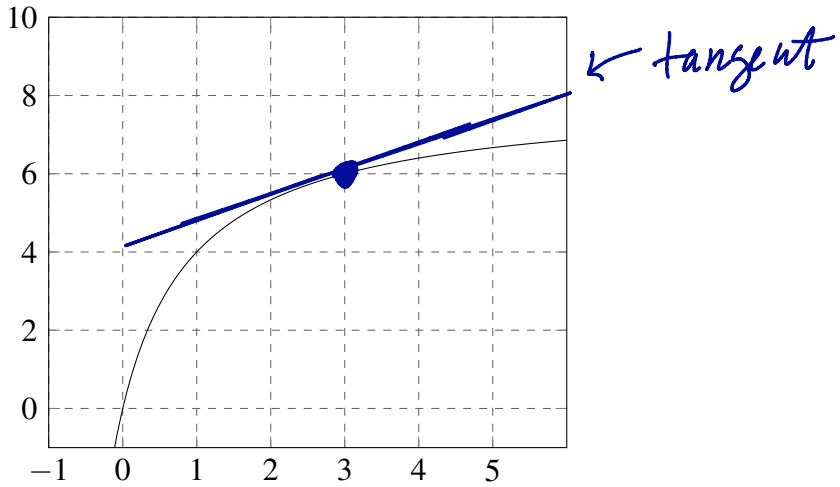
Use the information in the table to estimate the slope of the tangent line to $f(x)$ at the point $P(3,6)$.

$$m_{tan} \approx \frac{1}{2}$$

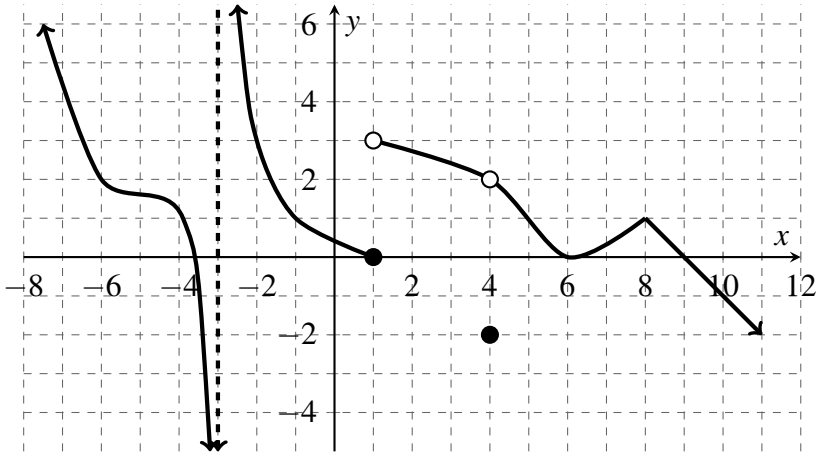
d. Use the slope from part (c) above to write an equation of the tangent line at point P.

$$y - 6 = \frac{1}{2}(x-3) \quad \text{or} \quad y = \frac{1}{2}x + \frac{9}{2}$$

e. 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. $f(1) =$ 0 **b.** $f(4) =$ −2 **c.** $f(8) =$ 1

d. $\lim_{x \to -3^+} f(x) =$ +∞ **e.** $\lim_{x \to -3} f(x) =$ DNE **f.** $\lim_{x \to 1^+} f(x) =$ 3

g. $\lim_{x \to 1} f(x) =$ DNE **h.** $\lim_{x \to 4} f(x) =$ 2 **i.** $\lim_{x \to 8} f(x) =$ 1

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

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