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 $P(1,4)$ 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 $Q(0, f(0))$.

    b. Find the slope of the secant line passing through P and the point $Q(3, f(3))$.

    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.
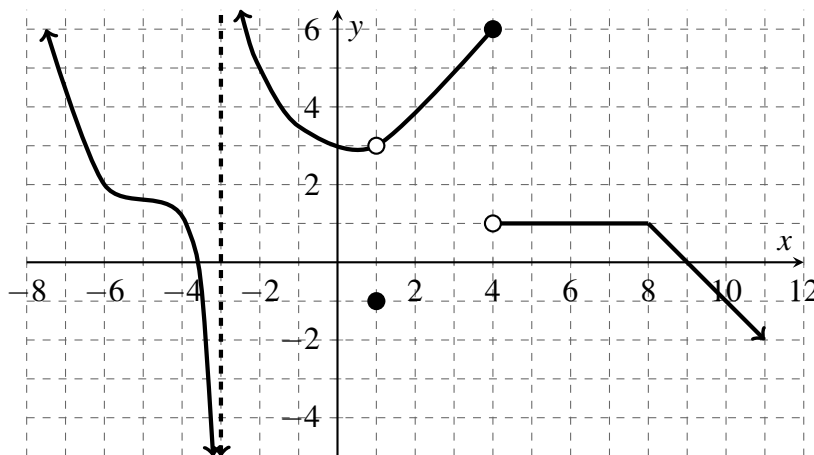
x	0.9	0.99	0.999	1.001	1.01	1.1
f(x)	3.78947	3.97989	3.99799	4.00199	4.01990	4.19047
m_{sec}	2.10526	2.01005	2.00100	1.99900	1.99005	1.90476

    Use the information in the table to estimate the slope of the tangent line to $f(x)$ at the point $P(1,4)$.

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

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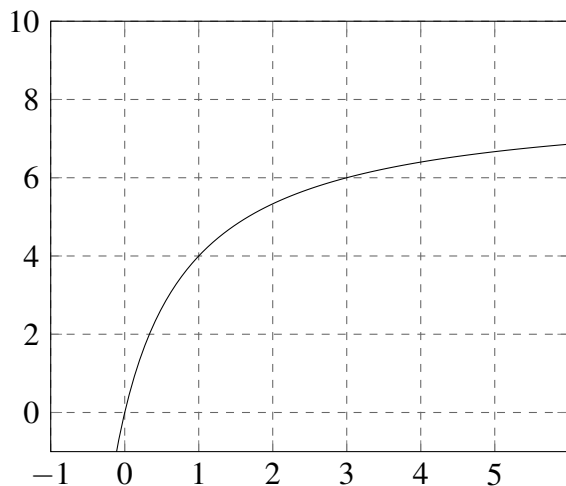
2. [9 points] Use the graph of the function of $f(x)$ to answer the following questions. Give the most complete answer; if the limit is infinite, indicate that with ∞ or $-\infty$. If a value does not exist, write DNE.

   a. $f(1) =$ _____   **b.** $f(4) =$ _____   **c.** $f(6) =$ _____

   d. $\lim\limits_{x \to -3^-} f(x) =$ _____   **e.** $\lim\limits_{x \to -3} f(x) =$ _____   **f.** $\lim\limits_{x \to 1} f(x) =$ _____

   g. $\lim\limits_{x \to 4^+} f(x) =$ _____   **h.** $\lim\limits_{x \to 4} f(x) =$ _____   **i.** $\lim\limits_{x \to 6} f(x) =$ _____

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

$$\lim_{x \to 2^-} f(x) = 5, \quad \lim_{x \to 2^+} f(x) = 1, \quad f(2)=3, \quad \lim_{x \to 4} f(x) = 3, \quad f(4) = 0$$