Name: Key ______ / 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 $P(2,2)$ be a point on the graph of $f(x) = \dfrac{6x-6}{x+1}$.

   a. Find the slope of the secant line passing through P and the point $Q(1, f(1))$.

   $m = \dfrac{0-2}{1-2} = 2$

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

   $m = \dfrac{3-2}{3-2} = 1$

   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	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	1.8621	1.9866	1.9987	2.0013	2.0133	2.1290
m_{sec}	1.3793	1.3378	1.3338	1.3328	1.3289	1.2903

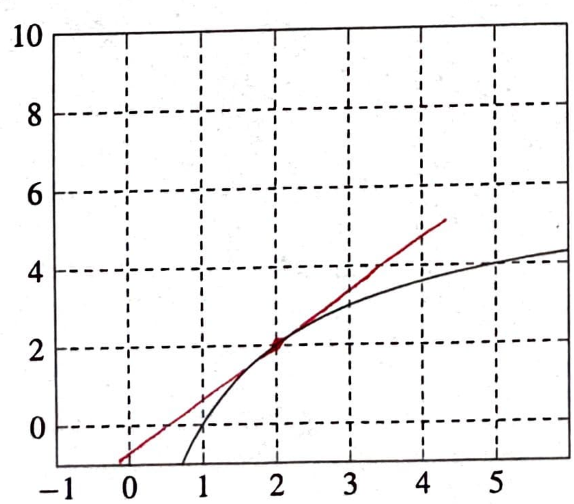
   Use the information in the table to estimate the slope of the tangent line to $f(x)$ at the point $P(2,2)$.

   $m \approx \frac{4}{3}$ or 1.33

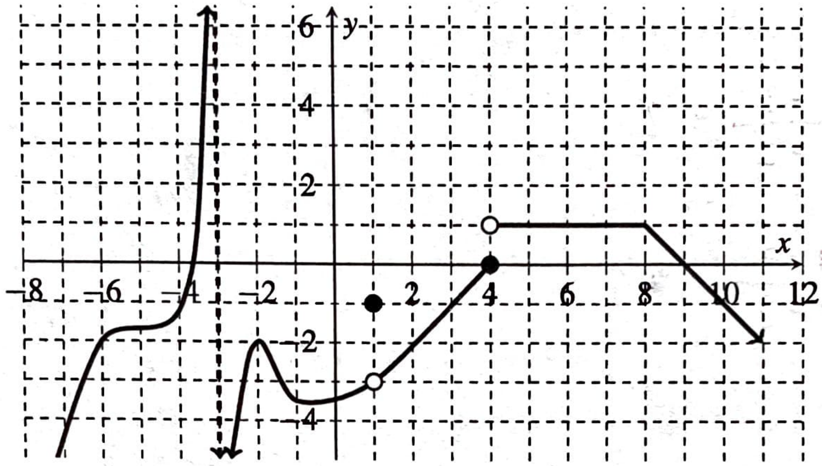
   d. Use the slope from part (c) above to write an equation of the tangent line at point P.

   $y - 2 = \frac{4}{3}(x-2) \Rightarrow y = \frac{4}{3}x - \frac{2}{3}$

   e. Below is a sketch of the graph of $f(x) = \frac{6x-6}{x+1}$. 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. $f(-2) =$ -2
b. $f(1) =$ -1
c. $f(4) =$ 0

d. $\lim_{x\to -3} f(x) =$ DNE
e. $\lim_{x\to -2} f(x) =$ -2
f. $\lim_{x\to 1} f(x) =$ -3

g. $\lim_{x\to 4^+} f(x) =$ 1
h. $\lim_{x\to 4^-} f(x) =$ 0
i. $\lim_{x\to 4} f(x) =$ DNE

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

$$\lim_{x\to1^-} f(x) = 2, \quad \lim_{x\to1^+} f(x) = 3, \quad f(1) = 5, \quad \lim_{x\to4} f(x) = 5, \quad f(4) = 0$$