Name: _____   _____ / 25
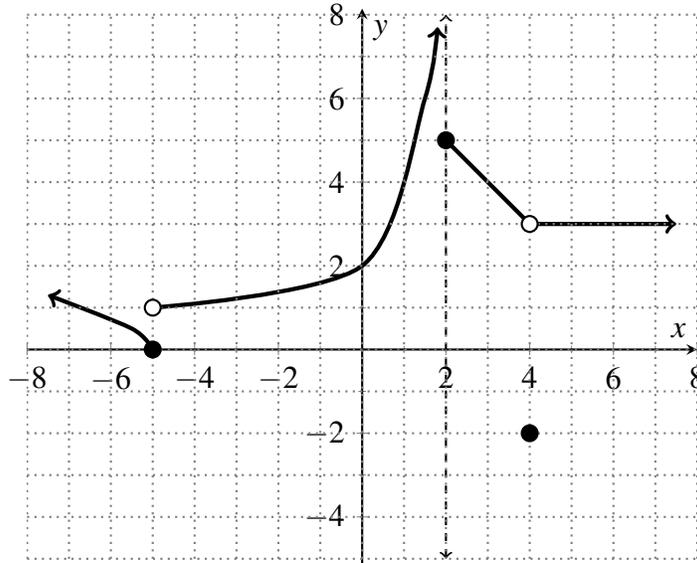
Please circle your instructor's name: Leah Berman   Jill Faudree

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

1. **[9 points]** Use the graph of the function of $f(x)$ to answer the following questions.

a. $\displaystyle\lim_{x \to -5^-} f(x) =$ _____

b. $\displaystyle\lim_{x \to -5^+} f(x) =$ _____

c. $\displaystyle\lim_{x \to -5} f(x) =$ _____

d. $f(-5) =$ _____

e. $f(2) =$ _____

f. $f(4) =$ _____

g. $\displaystyle\lim_{x \to 0} f(x) =$ _____

h. $\displaystyle\lim_{x \to 2^-} f(x) =$ _____

i. $\displaystyle\lim_{x \to 4} f(x) =$ _____

2. **[4 points]** An empty tank can hold 2000 gallons of water and is filled in one hour. The values in the table show the volume V of water in the tank (in gallons) after t minutes.

t (minutes)	0	10	20	30	40	50	60
V (gallons)	0	200	500	1100	1500	1800	2000

a. Find the average rate of change of the water in the tank in the first half of an hour. Include units in your answer.

b. During what 10 minute interval was the average rate of change of the water the greatest (in magnitude)?

3. **[6 points]** Compute the following infinite limits. For each limit, justify your answer with a sentence or two, perhaps with a rough sketch.
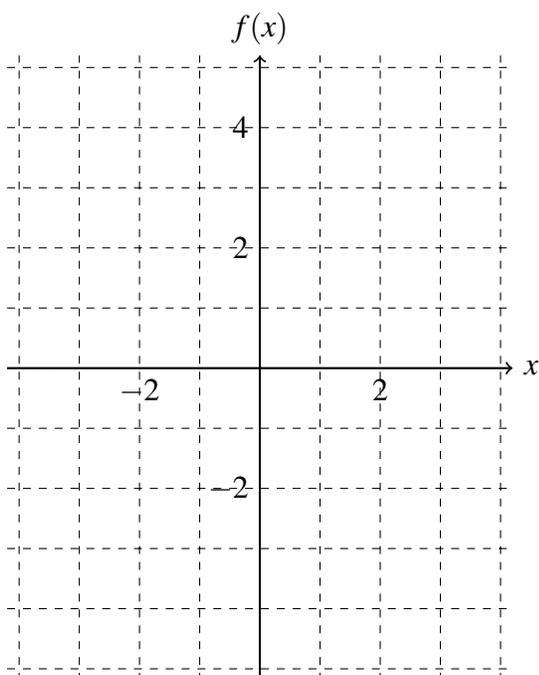
   a. $\lim\limits_{x \to 8^+} -2\ln(x-8) =$ ☐

   b. $\lim\limits_{x \to \pi^+} \dfrac{x+1}{\pi - x} =$ ☐

4. **[6 points]** On the axes below, sketch the graph of the function

$$f(x) = \begin{cases} 4+x & x < 0 \\ 3 & x = 0 \\ e^x & x > 0. \end{cases}$$

Then compute, with brief justification, the requested values in the table.

$f(x)$

Value	Justification
$f(0) =$	
$\lim\limits_{x \to 0^-} f(x) =$	
$\lim\limits_{x \to 0} f(x) =$	