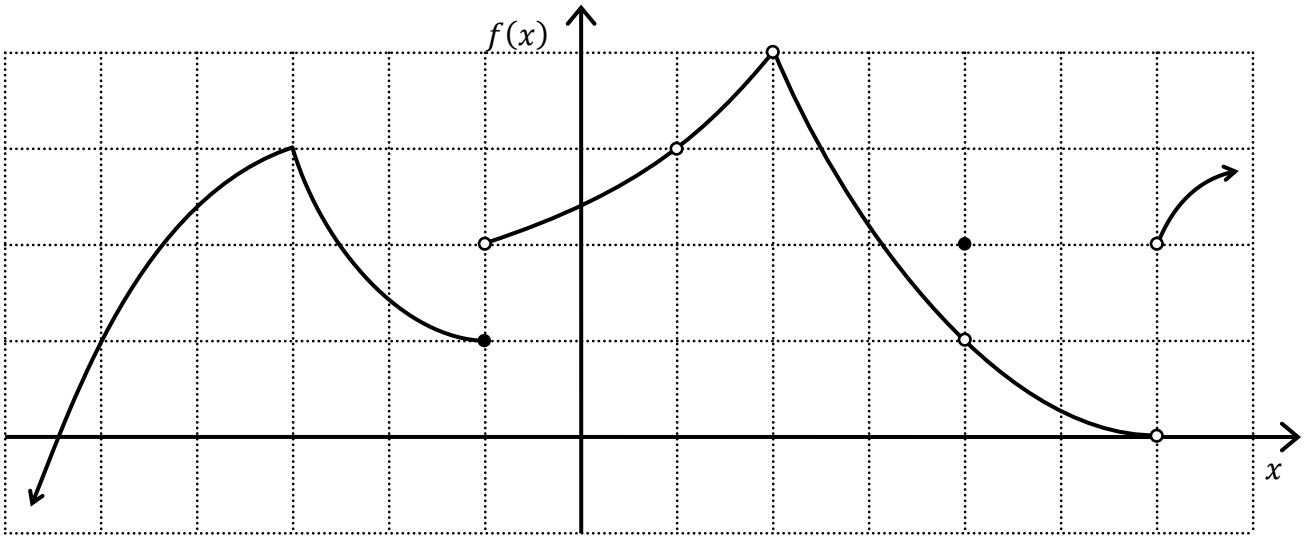
Recitation Section Number: _____

L	A	S	T		N	A	M	E	S				F	I	R	S	T		N	A	M	E	S

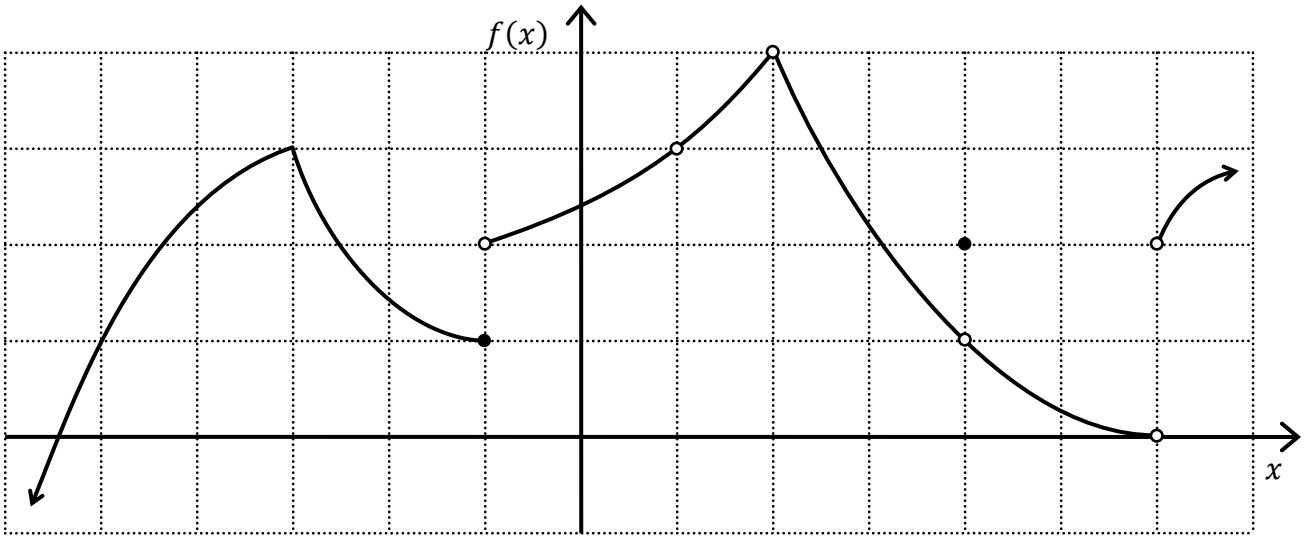
MATH 2301 (Barsamian) Recitation R01 Problems

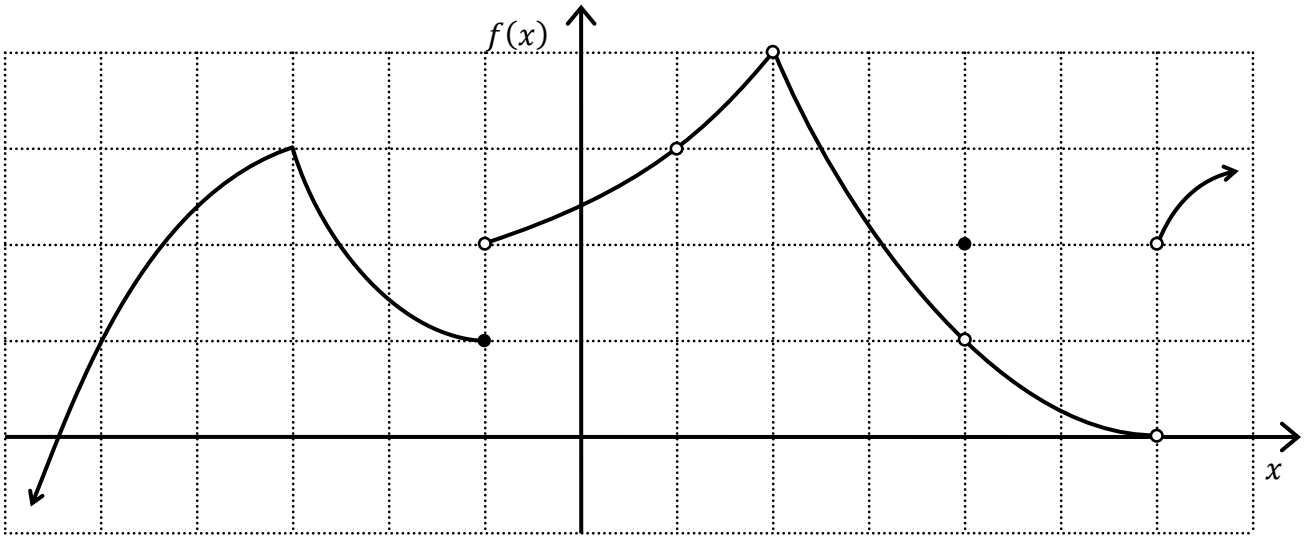
Problem [1]: Limits for a Function Described by a Graph

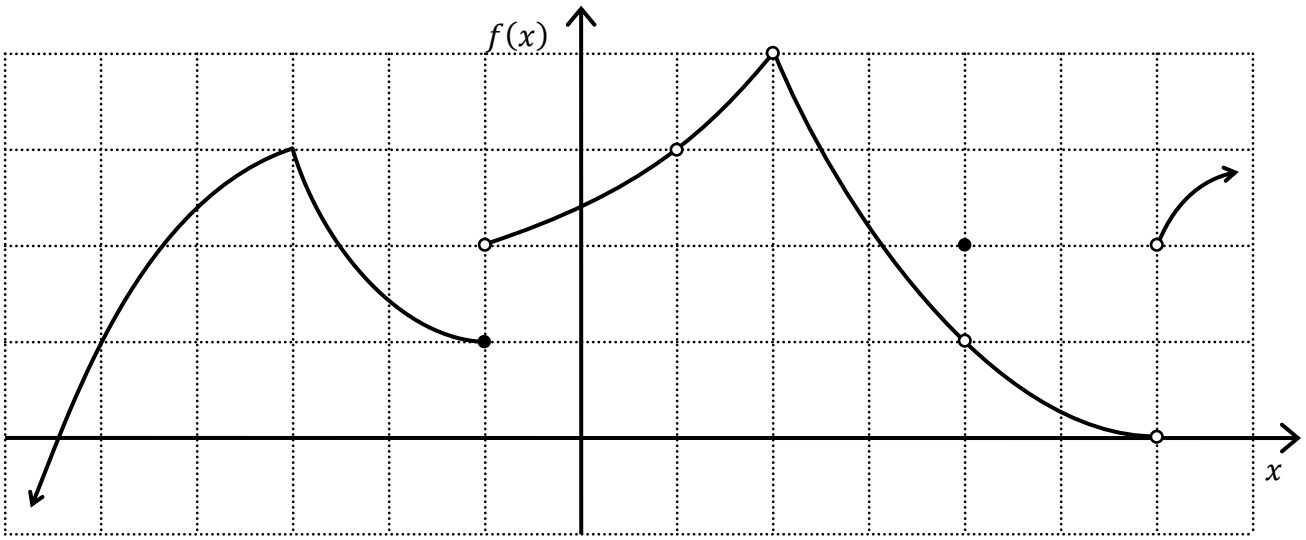


Use the graph above (and extra copies on back) to fill in the table below.

x-value	limit from left	limit from right	limit	y-value
-5	$\lim_{x\to -5^-} f(x) =$	$\lim_{x\to -5^+} f(x) =$	$\lim_{x\to -5} f(x) =$	$f(-5) =$
-3	$\lim_{x\to -3^-} f(x) =$	$\lim_{x\to -3^+} f(x) =$	$\lim_{x\to -3} f(x) =$	$f(-3) =$
-1	$\lim_{x\to -1^-} f(x) =$	$\lim_{x\to -1^+} f(x) =$	$\lim_{x\to -1} f(x) =$	$f(-1) =$
1	$\lim_{x\to 1^-} f(x) =$	$\lim_{x\to 1^+} f(x) =$	$\lim_{x\to 1} f(x) =$	$f(1) =$
2	$\lim_{x\to 2^-} f(x) =$	$\lim_{x\to 2^+} f(x) =$	$\lim_{x\to 2} f(x) =$	$f(2) =$
4	$\lim_{x\to 4^-} f(x) =$	$\lim_{x\to 4^+} f(x) =$	$\lim_{x\to 4} f(x) =$	$f(4) =$
6	$\lim_{x\to 6^-} f(x) =$	$\lim_{x\to 6^+} f(x) =$	$\lim_{x\to 6} f(x) =$	$f(6) =$


$f(x)$
x


$f(x)$
x


$f(x)$
x

.

Problem [2]: Drawing a function with specified limit properties

Sketch the graph (just one) of an example of a function that satisfies all of the given conditions:

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

Problem [3]: Guessing a limit by plugging in values

Without using a calculator, answer the following questions about the function

$$f(x) = \frac{x^2 - 3x}{x^2 - x - 6}$$

Part 1: Function Values

(1) Factor f.

(2) Are you allowed to cancel factors in the factored form of f? Explain why you think you are allowed to cancel, or why you are not.

(3) Find $f(1)$ by substituting $x = 1$ into the factored version of f.

(4) Find $f(2)$ by substituting $x = 2$ into the factored version of f.

(5) Find $f(3)$ by substituting $x = 3$ into the factored version of f.

Part 2: Limit as $x \to 3$

Using the factored form of f, compute the following values and guess the limits. **(No calculators) (Simplify your expressions by cancelling when possible, but don't bother doing the division. That is, leave your answers as fractions.)**

Guessing the Limit from the right:

(6) Find $f(3.1)$. **Hint:** I'll do this one for you.

Solution: $f(3.1) = \dfrac{3.1(3.1-3)}{(3.1+2)(3.1-3)} \underset{\substack{\text{can cancel because} \\ \text{the terms are not zero}}}{=} \dfrac{3.1}{(3.1+2)} = \dfrac{3.1}{5.1} =$ close to $\dfrac{3}{5}$

(7) $f(3.01) =$

(8) $f(3.001) =$

(9) Guess $\lim\limits_{x \to 3^+} f(x) =$

Guessing the Limit from the left:

(10) $f(2.9) =$

(11) $f(2.99) =$

(12) $f(2.999) =$

(13) Guess $\lim\limits_{x \to 3^-} f(x) =$

Guessing the Limit:

(14) Guess $\lim\limits_{x \to 3} f(x) =$