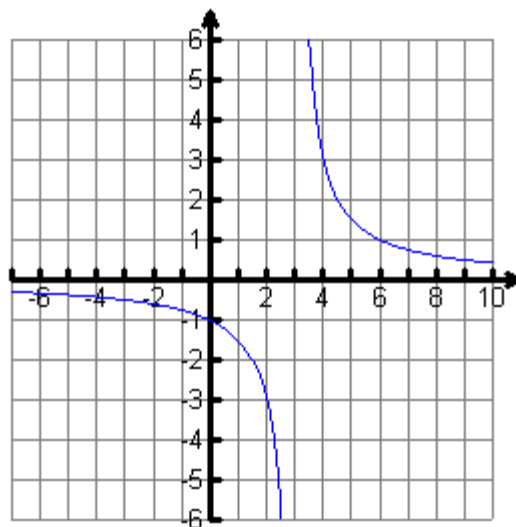


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Chapter 1: Limits & Continuity

Enter the function  $f(x) = \frac{3}{x-3}$  as  $y_1$  on your calculator. On the tableset menu, set the independent variable to **ASK**. Go to the **TABLE** and use your calculator to help you complete the following.



(a)

x	y <sub>1</sub>
1	
0.1	
0.01	
0.001	

x	y <sub>1</sub>
-1	
-0.1	
-0.01	
-0.001	

Conclusion: As  $x \rightarrow 0$ ,  $f(x) \rightarrow$  \_\_\_\_\_

(b)

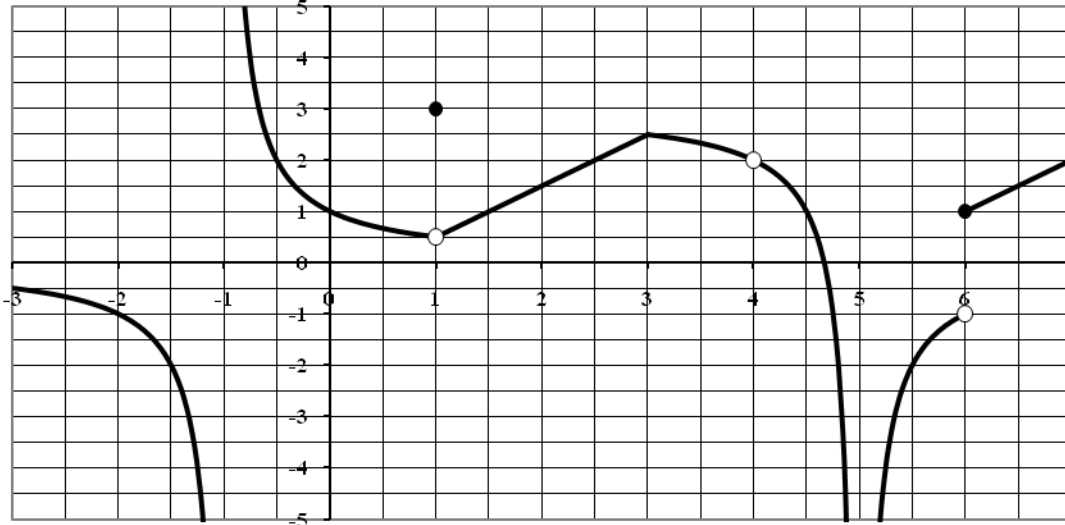
x	y <sub>1</sub>
2	
2.9	
2.99	
2.999	

x	y <sub>1</sub>
4	
3.1	
3.01	
3.001	

(c) Conclusion: As  $x \rightarrow 3$ ,  
 $f(x) \rightarrow$  \_\_\_\_\_

**I. Evaluating Limits Graphically**

1. The function  $f$  has the graph shown. Using this graph, fill out the table below. If the limit does not exist, state this.



$a$	$f(a)$	$\lim_{x \rightarrow a^-} f(x)$	$\lim_{x \rightarrow a^+} f(x)$	$\lim_{x \rightarrow a} f(x)$
-2				
-1				
0				
1				
4				
5				
6				

**II. Evaluating a limit numerically.**

- 2(a) Let  $f(x) = \frac{\sqrt{x^2 - 6x + 9}}{2x - 6}$ . Use your calculator to fill in each chart and then evaluate each one-sided limit below.

$x$	2.9	2.99	2.999	2.9999
$f(x)$				

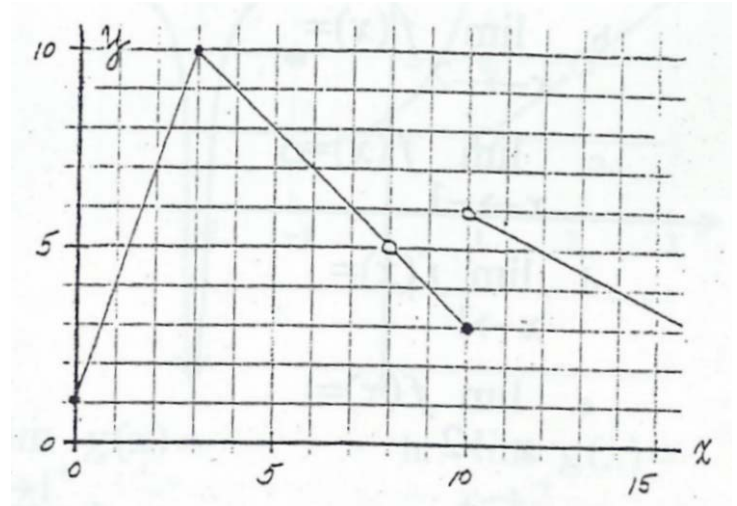
$x$	3.1	3.01	3.001	3.0001
$f(x)$				

$\lim_{x \rightarrow 3^-} f(x) =$   $\lim_{x \rightarrow 3^+} f(x)$

- (b) Does  $\lim_{x \rightarrow 3} f(x)$  exist? Why or why not?

**Continuity**

The complete graph of a function  $f(x)$  is given the right. Describe the behavior of the function by examining y-values



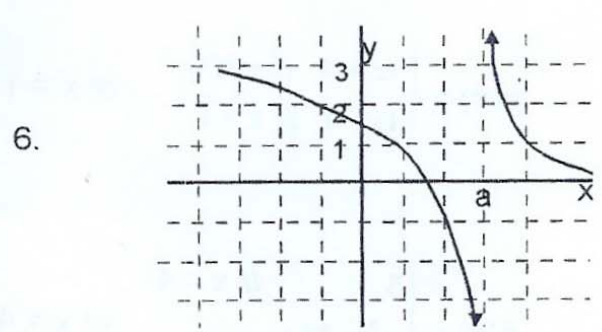
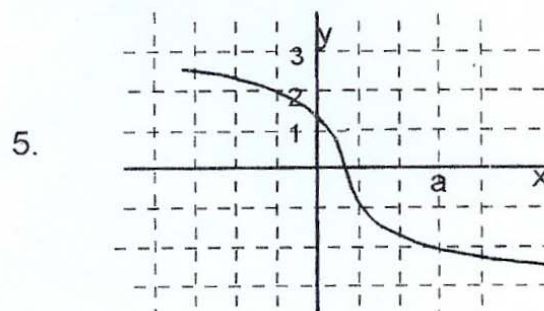
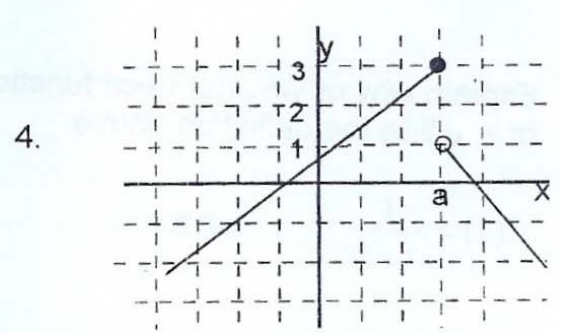
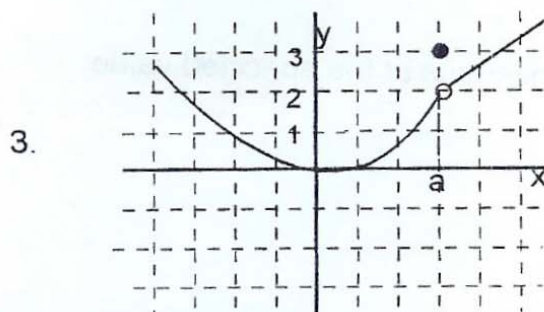
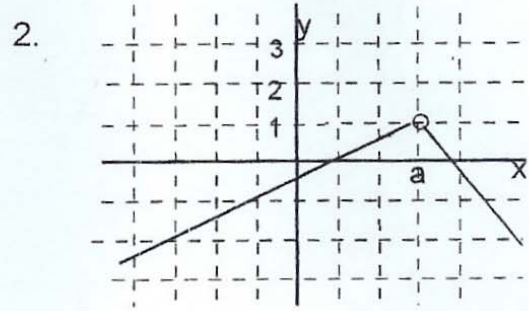
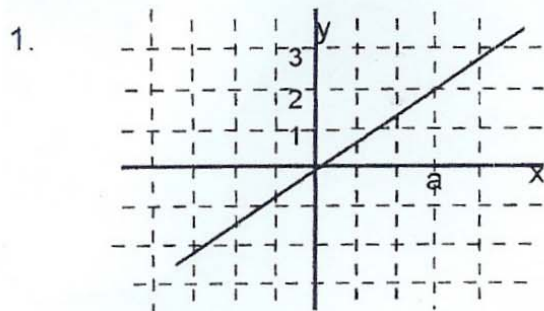
- (a) As  $x \rightarrow 3^-$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  
 $\lim_{x \rightarrow 3^-} f(x) =$   
 As  $x \rightarrow 3^+$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  
 $\lim_{x \rightarrow 3^+} f(x) =$   
 As  $x \rightarrow 3$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  
 $\lim_{x \rightarrow 3} f(x) =$   
 What is the value of  $f(3)$ ?

- (b) As  $x \rightarrow 8^-$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  $\lim_{x \rightarrow 8^-} f(x) =$   
 As  $x \rightarrow 8^+$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  $\lim_{x \rightarrow 8^+} f(x) =$   
 As  $x \rightarrow 8$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  $\lim_{x \rightarrow 8} f(x) =$   
 What is the value of  $f(8)$ ?

- (c) As  $x \rightarrow 10^-$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  $\lim_{x \rightarrow 10^-} f(x) =$   
 As  $x \rightarrow 10^+$ , then  $f(x) \rightarrow$  \_\_\_\_\_ or  $\lim_{x \rightarrow 10^+} f(x) =$   
 $\lim_{x \rightarrow 10} f(x) =$  \_\_\_\_\_  
 What is the value of  $f(10)$ ?

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A. There are six functions pictured below. Which of these six would you describe as being continuous at  $x = a$ ?



B. For each function above, find  $f(a)$  and  $\lim_{x \rightarrow a} f(x)$ .

1.  $f(a) =$

2.  $f(a) =$

3.  $f(a) =$

$\lim_{x \rightarrow a} f(x) =$

$\lim_{x \rightarrow a} f(x) =$

$\lim_{x \rightarrow a} f(x) =$

4.  $f(a) =$

5.  $f(a) =$

6.  $f(a) =$

$\lim_{x \rightarrow a} f(x) =$

$\lim_{x \rightarrow a} f(x) =$

$\lim_{x \rightarrow a} f(x) =$