

## Finding limits with the TI-89

To find the limit of some function  $f(x)$  as  $x \rightarrow a$ : Go to **F3 Calc**. Then select **3: limit(**  
 The command line should then be completed in the following form:

$$\text{limit}(f(x), x, a)$$

**Examples:**

<u>Entered command</u>	<u>Result</u>
$\text{limit}((2x - 3)/(x^2 - 1), x, -\infty)$	0
$\text{limit}((2x - 3)/(x^2 - 1), x, -1)$	undef
$\text{limit}((2x - 3)/(x^2 - 1), x, -1, -1)$	$-\infty$

(Note: Entering a negative number such as -1 as an additional part of the command means to take the limit from the left. Remember that “pretty print” will echo the usual limit notation on your home screen.)

$\text{limit}((2x - 3)/(x^2 - 1), x, -1, 1)$	$\infty$
--	----------

(Entering a positive number such as 1 as an additional part of the command means to take the limit from the right.)

$\text{limit}((2x - 3)/(x^2 - 1), x, 1, -1)$	$\infty$
$\text{limit}((2x - 3)/(x^2 - 1), x, 1, 1)$	$-\infty$
$\text{limit}((2x - 3)/(x^2 - 1), x, \infty)$	0

**Exercise:** Let  $f(x) = (2x^2 - 3)/(x^2 - 1)$ . Use the TI-89 to find the limit of  $f(x)$  as  $x$  approaches

- |                    |                     |                      |
|--------------------|---------------------|----------------------|
| a. $-\infty$       | b. -1 from the left | c. -1 from the right |
| d. 1 from the left | e. 1 from the right | f. $\infty$          |

(You should be able to check these using “paper and pencil” techniques as well. These limits are useful for sketching the graph of  $f$ .)

[Answers: a. 2	b. $-\infty$	c. $\infty$
d. $\infty$	e. $-\infty$	f. 2 ]