Finding Limits Numerically

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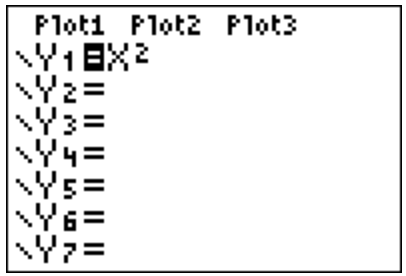
- **Go to *TABLE* and manually enter *x*-values that are both slightly below and slightly above the value at which you want to find the limit**

EXAMPLE:

$$y = x^2$$

$$\lim_{x \to 2} x^2 = ?$$

EXAMPLE:



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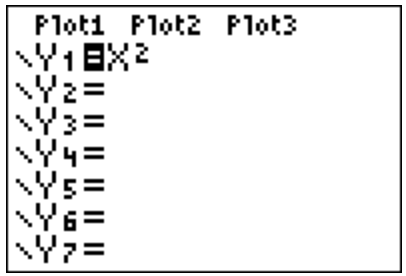

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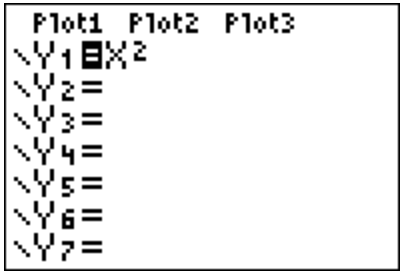

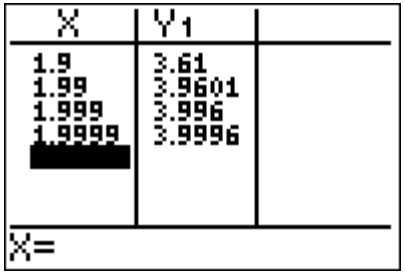

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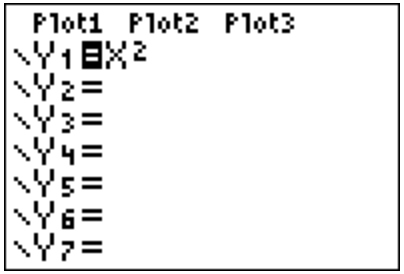

X	Y1
1.9	3.61
1.99	3.9601
1.999	3.996
1.9999	3.9996
■	

X=

X	Y1
2.1	4.41
2.01	4.0401
2.001	4.004
2.0001	4.0004
■	

X=

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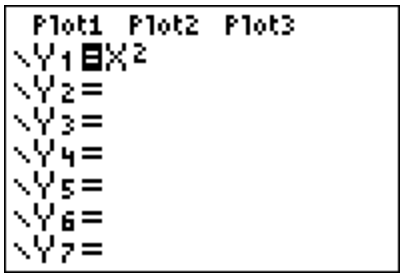

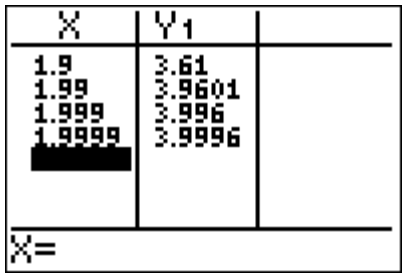

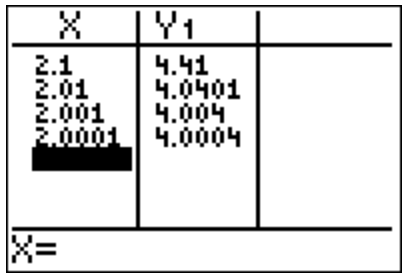

$$\lim_{x \to 2^-} x^2 = 4$$

$$\lim_{x \to 2^+} x^2 = 4$$

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EXAMPLE:

$$y = \frac{1}{x}$$

$$\lim_{x \to 0} \left(\frac{1}{x} \right) = ?$$

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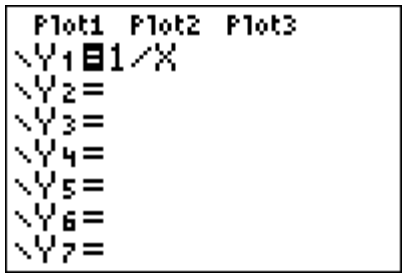

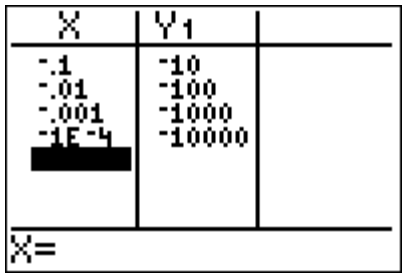

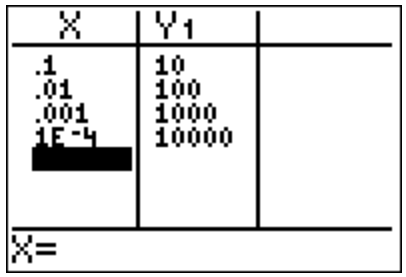

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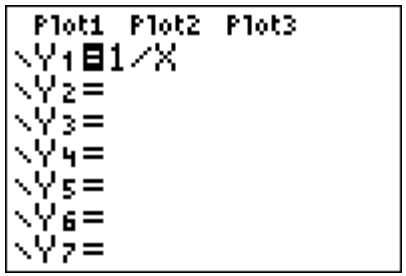

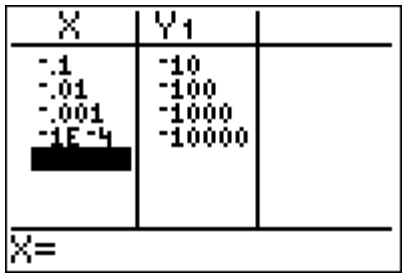

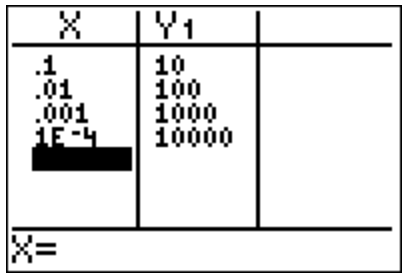

$$\lim_{x \to 0^-} 1/x = -\infty$$

$$\lim_{x \to 0^+} 1/x = \infty$$

$$\lim_{x \to 0} 1/x = \text{ does not exist}$$

We can also explore *piecewise-defined functions.*

$$y = f(x) = \begin{cases} x^2 - 1 & \text{if } x \le 1 \\ x & \text{if } x > 1 \end{cases}$$

$$\lim_{x \to 1} f(x) = ?$$

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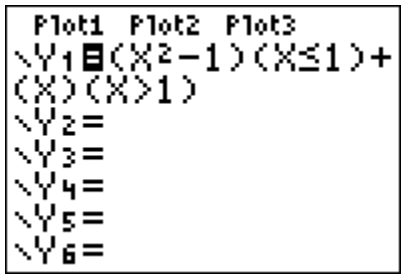

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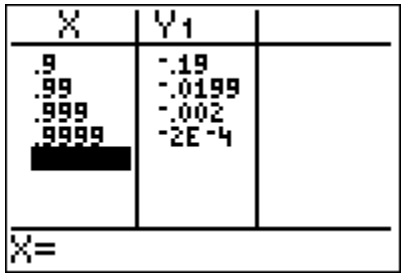

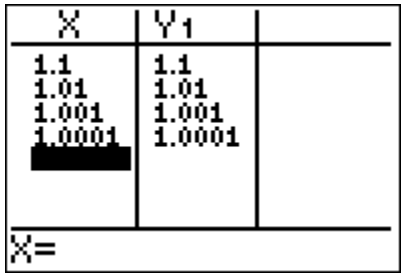

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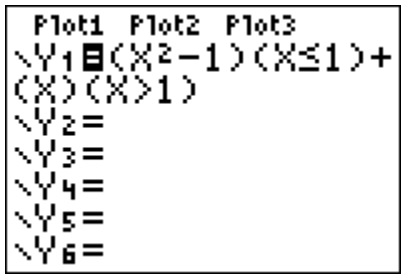

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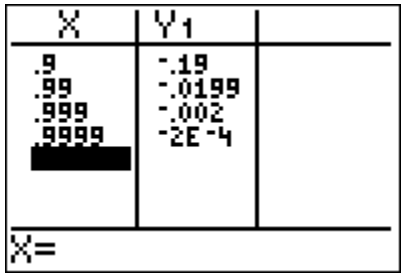

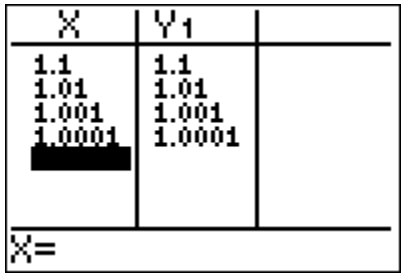

$$\lim_{x \to 1^-} f(x) = 0$$

$$\lim_{x \to 1^+} f(x) = 1$$

$$\lim_{x \to 1} f(x) = \text{ does not exist}$$

EXAMPLE:

$$y = f(x) = \begin{cases} -x+1 & \text{if } x \le 1 \\ x-1 & \text{if } x > 1 \end{cases}$$

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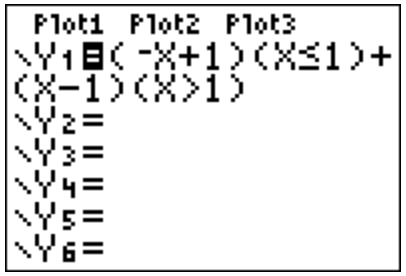

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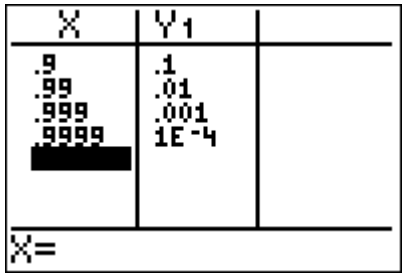

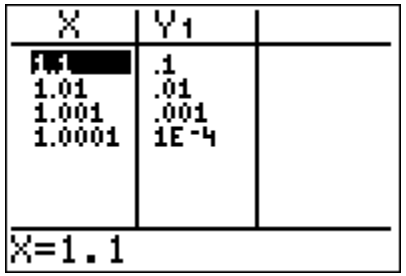

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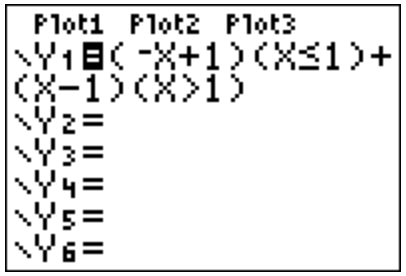

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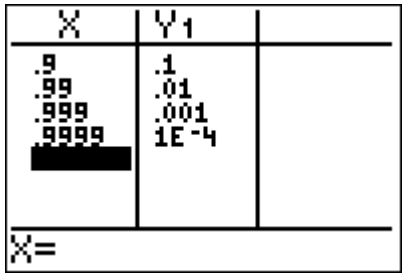

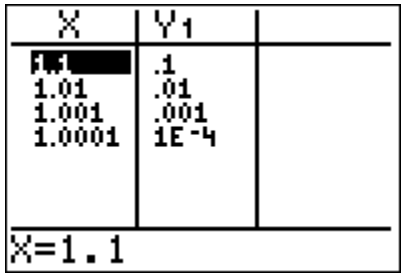

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You Can Count on Numbers!