

Worksheet 2.2.
Limits: A Numerical and Graphical Approach

1. Use your graphing calculator to graph $f(x) = \frac{\cos x}{x^2}$. Make a guess as to the value of $\lim_{x \rightarrow 0} \frac{\cos x}{x^2}$. Construct a table of values for $f(-.1), f(-.01), f(-.001), f(-.0001), f(.1), f(.01), f(.001), f(.0001)$. Estimate $\lim_{x \rightarrow 0} \frac{\cos x}{x^2}$.
2. Graph $f(x) = x \frac{|x-1|}{x-1}$. What is the $\lim_{x \rightarrow 1^+} f(x)$ and $\lim_{x \rightarrow 1^-} f(x)$? Construct a table of values for $f(.9), f(.99), f(.999), f(1.001), f(1.01), f(1.1)$. What is the $\lim_{x \rightarrow 1^+} f(x)$ and $\lim_{x \rightarrow 1^-} f(x)$?

3. Using a graphing calculator, graph $f(x) = \sin \frac{1}{x}$. Does it look as if $\lim_{x \rightarrow 0} f(x)$ exists? Construct a table of values for $f(-.1), f(-.01), f(-.001), f(-.0001), f(.1), f(.01), f(.001), f(.0001)$. What do you conclude about $\lim_{x \rightarrow 0} f(x)$?
4. Using a graphing calculator, graph $f(x) = \frac{\sin x}{x}$. Make a guess as to the $\lim_{x \rightarrow 0} f(x)$. Construct a table of values for $f(-.1), f(-.01), f(-.001), f(-.0001), f(.1), f(.01), f(.001), f(.0001)$. Estimate $\lim_{x \rightarrow 0} f(x)$.