UNIVERSITY OF WOLLONGONG IN DUBAI

# Math 141 Tutorial 1

## LIMITS & CONTINUITY

1. Find each limit.

A. $\lim_{\theta\to 0}\dfrac{\sin(2\theta)}{\theta}=$

B. $\lim_{y\to\infty}\dfrac{\sqrt{y^2+2}}{5y-6}=$

C. $\lim_{t\to 1^+}\dfrac{|1-t|}{1-t}=$

2. Find each of these limits.

$$f(x)=\frac{x-2}{|x|-2}$$

$\lim_{x\to-\infty} f(x)=$

$\lim_{x\to\infty} f(x)=$

$\lim_{x\to-2^-} f(x)=$

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

$\lim_{x\to 2} f(x)=$

3.

Evaluate $\lim_{x\to 2}\dfrac{1-\frac{4}{x^2}}{1-\frac{2}{x}}$, if it exists.

Evaluate $\lim_{x\to 0}\dfrac{x+\frac{2}{x}}{x-\frac{3}{x}}$, if it exists.

4. Find the value of $k$ that would make the limit exist. Find the limit.

A. $\lim_{x\to\infty}\dfrac{2x^3-6}{x^k+3}$

B. $\lim_{x\to 2}\dfrac{x^2+kx-10}{x-2}$

5 . In each case sketch a graph with the given characteristics.

A. $f(4)$ is undefined and $\lim_{x\to 4} f(x)=2$

B. $f(3)=2$ and $\lim_{x\to 3} f(x)$ does not exist.

C. $f(1)=3$ and $\lim_{x\to 1} f(x)=-2$

6.

Sketch the graph of $f(x)=\begin{cases}2x+1, x<1\\ 1, x=1\\ 2x-1, x>1\end{cases}$ and classify the discontinuities, if any.

7.

Define $f(x)=\dfrac{x^2+x-6}{x-2}$ at $x=2$ so that it becomes continuous at 2.

8.

Let $f(x)=\begin{cases}\dfrac{x^2-x-2}{x+1}, x\geq -1\\ A, x<-1\end{cases}$. Find A given that $f$ is continuous at $-1$.

9.

Use the pinching theorem to find $\lim_{x \to 0} \sqrt{x} \cos \frac{1}{x^2}$.