Calculus 3208 Unit: Limits and Continuity

Worksheet 6: Continuity (Lesson 2.11)

1. Let $f(x)$ be given as $f(x)=\begin{cases}2x^2+x+2, & x\geq 1\\ x^2+5x-1, & x<1\end{cases}$

Determine whether $f(x)$ is continuous at $x = 1$.

2. Given $f(x)=\begin{cases}x+1 & x\leq 1\\ \dfrac{x-2}{x^2-2x} & x>1\end{cases}$

Use the definition of continuity to determine all points at which $f(x)$ is not continuous. Classify any discontinuities as removable or non-removable.

3. Given the function $f(x)=\begin{cases}\dfrac{x-3}{x^2-1}, & for\ \ x<0\\ \dfrac{x^2+2x-8}{x-2}, & for\ 0\le x<4\\ \dfrac{2x}{x-3}, & for\ \ x\ge 4\end{cases}$

Use the definition of continuity to determine all points at which $f(x)$ is not continuous. Classify any discontinuities as removable or non-removable.

4. Let $f(x)=\begin{cases} kx+2k, & for\ \ x<-1 \\ k^2, & for\ \ x=-1 \\ kx, & for\ \ x>-1 \end{cases}$ Find all values of k for which $f(x)$ is continuous at $x=-1$.

5. Given the function $f(x)=\begin{cases} \dfrac{x^2+(k-3)x-3k}{x^2-(k+3)x+3k}, & x\neq 3 \\ kx-k+1, & x=3 \end{cases}$

Use the definition of continuity to determine all values of the constant k for which $f(x)$ is continuous at $x=3$.