MAC2311 Class Number 15498
QUIZ 2
1/24/2019

Name: SOLUTIONS

1. Find the limit:

$$\lim_{x\to 0}\frac{x^2+2x-12}{x^2+x-2} = \frac{0+2(0)-12}{0+0-2} = \frac{-12}{-2} = \boxed{6}$$

2. Let $f(x)=\dfrac{x^2-x-12}{x^2-3x-4}$. How would you define $f(4)$ in order to make f continuous at 4?

$f(x) = \dfrac{(x-4)(x+3)}{(x-4)(x+1)} = \dfrac{(x+3)}{(x+1)}$. FIND $f(4)$ FOR $f(x)=\dfrac{x+3}{x+1}$

$\Rightarrow f(4)=\dfrac{4+3}{4+1}=\dfrac{7}{5}$

$\Rightarrow \boxed{f(4)=\dfrac{7}{5}}$

3. Let

$$f(x)=\begin{cases}(x-3)^2-10 & -\infty < x \le -2\\ x+6 & -2 < x \le -1\\ x^2-3x+1 & -1 < x < \infty\end{cases}$$

Find the numbers at which f is discontinuous. At which of these points of discontinuity is f continuous from the right? At which of these points of discontinuity is f continuous from the left? *LOOK @ "CHANGE" POINTS, $x=-2$, $x=-1$

1. $\lim_{x\to -2^-} f(x) = (-2-3)^2-10 = (-5)^2-10 = 15$

$\lim_{x\to -2^+} f(x) = (-2+6) = 4$

SINCE $\lim_{x\to -2^-} f(x) \neq \lim_{x\to -2^+} f(x)$, f IS DISCONTINUOUS AT $x=-2$. SINCE f IS DEFINED AT $x=-2$ FROM THE LEFT, f IS CONTINUOUS AT $x=-2$ FROM THE LEFT. f IS NOT CONTINUOUS AT $x=-2$ FROM THE RIGHT.

2. $\lim_{x\to -1^-} f(x) = -1+6 = 5$

$\lim_{x\to -1^+} f(x) = (-1)^2-3(-1)+1 = 1+3+1 = 5$