Magnet Analysis 1A
Rose

Name KEY

Introduction to Limits

1. $\lim_{x\to 1}\frac{x^3-1}{x-1} = \lim_{x\to 1}\frac{\cancel{(x-1)}(x^2+x+1)}{\cancel{x-1}}$

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

2. $\lim_{x\to 0}\frac{5\sin 2x}{x}\cdot\frac{2}{2}$

$= 10\lim_{x\to 0}\frac{\sin(2x)}{(2x)}$

$= 10\cdot 1 = 10$

3. $\lim_{x\to 2}\frac{1-\sqrt{x-1}}{x-2}\left(\frac{1+\sqrt{x-1}}{1+\sqrt{x-1}}\right)$

$= \lim_{x\to 2}\frac{1-(x-1)}{(x-2)(1+\sqrt{x-1})}$

$= \lim_{x\to 2}\frac{\cancel{2-x}}{\cancel{x-2}(1+\sqrt{x-1})}$

$= \lim_{x\to 2}\frac{-1}{1+\sqrt{x-1}} = -\frac{1}{2}$

4. $\lim_{x\to 3}\frac{x-1}{\sqrt{x+6}-3}$

$\lim_{x\to 3^-}\frac{x-1}{\sqrt{x+6}-3} \approx \frac{2}{0^-} = -\infty$

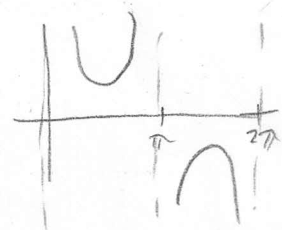
$\lim_{x\to 3^+}\frac{x-1}{\sqrt{x+6}-3} \approx \frac{2}{0^+} = \infty$

so $\lim_{x\to 3}\frac{x-1}{\sqrt{x+6}-3}$ d.n.e.

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

$= 2$

6. $\lim_{x\to \pi^+}\csc x = -\infty$



7. $\lim_{x\to 4}\frac{\sqrt{x}-2}{x-4} = \lim_{x\to 4}\frac{\cancel{\sqrt{x}-2}}{(\cancel{\sqrt{x}-2})(\sqrt{x}+2)}$

$= \lim_{x\to 4}\frac{1}{\sqrt{x}+2} = \frac{1}{4}$

8. $\lim_{x\to 4^-}\frac{x^2+x-20}{x^2-6x-7} = \lim_{x\to 4^-}\frac{(x+5)(x-4)}{(x-7)(x+1)}$

$+ \quad - \quad + \quad - \quad +$

$-5 \quad -1 \quad 4 \quad 7$

0