Magnet Analysis 1A
Rose

Name KEY

Limits Review I

1. $\lim_{x\to -3}\left(x^3-4x^2+2\right)$

$(-3)^3-4(-3)^2+2$

$-27-36+2$

-61

2. $\lim_{x\to 5}\frac{2x-10}{x^2-4x-5} = \lim_{x\to 5}\frac{2(x-5)}{(x-5)(x+1)}$

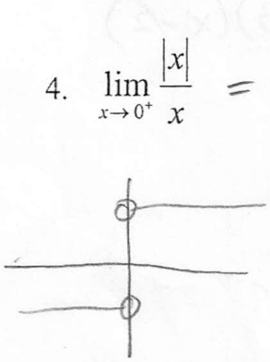
$= \lim_{x\to 5}\frac{2}{x+1} = \frac{1}{3}$

3. $\lim_{x\to 2^-}\frac{3x}{x^2+6x-16} = \lim_{x\to 2^-}\frac{3x}{(x+8)(x-2)}$

$-\quad +\quad -\quad +$ (sign chart at -8, 0, 2)

$-\infty$

4. $\lim_{x\to 0^+}\frac{|x|}{x} = 1$

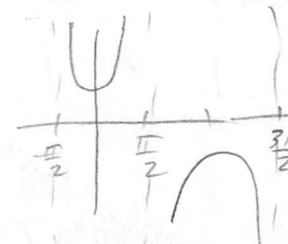


5. $\lim_{x\to 4}\sqrt{x-4}$ d.n.e. (due to technicality)

$\lim_{x\to 4^-}\sqrt{x-4}$ d.n.e.

$\lim_{x\to 4^+}\sqrt{x-4} = 0$

6. $\lim_{x\to \frac{3\pi}{2}^-}\sec x = -\infty$



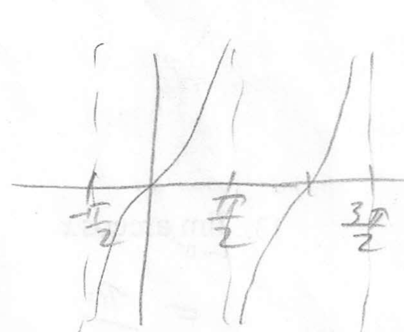
7. $\lim_{x\to 3}\sqrt[6]{81-x^4}$ d.n.e. b/c

$\lim_{x\to 3^-}\sqrt[6]{81-x^4} = 0$

$\lim_{x\to 3^+}\sqrt[6]{81-x^4}$ d.n.e.

8. $\lim_{x\to \frac{\pi}{2}^+}\tan x$

$-\infty$



9. $\lim_{x\to\infty}\frac{7x+19}{4x-3}$ $\frac{\frac{1}{x}}{\frac{1}{x}}$

$\lim_{x\to\infty}\frac{7+\frac{19}{x}}{4-\frac{3}{x}} = \frac{7}{4}$ ($\frac{19}{x}\to 0$, $\frac{3}{x}\to 0$)

10. $\lim_{x\to 0} e^x \cos x\sqrt{9-x^2}$

$= \left(\lim_{x\to 0} e^x\right)\left(\lim_{x\to 0}\cos x\right)\left(\lim_{x\to 0}\sqrt{9-x^2}\right)$

$1 \cdot 1 \cdot 3 = 3$

11. $\lim_{x\to 0}\frac{\sin 5x}{x}\left(\frac{5}{5}\right)$

$5\cdot\lim_{x\to 0}\frac{\sin(5x)}{(5x)} = 5\cdot 1 = 5$

12. $\lim_{x\to\pi}\frac{\cos x}{x} = \frac{-1}{\pi}$

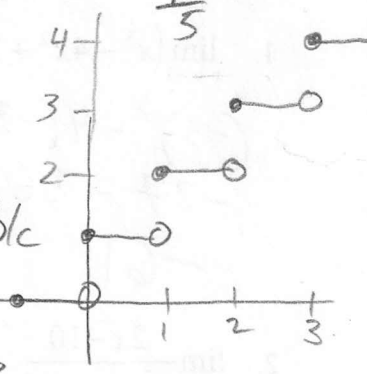
13. $\lim_{x\to 0^-}\arccos x$

$= \frac{\pi}{2}$

14. $\lim_{x\to\infty}\frac{7x^2-3x+2}{-5x^2+1}$ $\frac{\frac{1}{x^2}}{\frac{1}{x^2}}$

$= \lim_{x\to\infty}\frac{7-\frac{3}{x}+\frac{2}{x^2}}{-5+\frac{1}{x^2}} = \frac{-7}{5}$

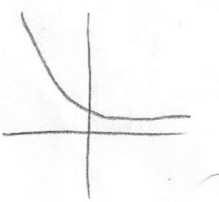
15. $\lim_{x\to 3}\lfloor x+1\rfloor$ d.n.e. b/c



$\lim_{x\to 3^-}[\![x+1]\!] = 3$

$\lim_{x\to 3^+}[\![x+1]\!] = 4$

16. $\lim_{x\to-\infty} 2^{-x} = \infty$



1	1	0	-7	6
		1	1	-6
	1	1	-6	0

17. $\lim_{x\to -1^+}\frac{(x^3+1)(x-2)}{x^3-7x+6}$

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

$= \frac{0}{12} = 0$