Math 17A
Vogler
Discussion Sheet 4

1.) Evaluate the following limits.

a.) $\lim_{x\to\infty} \dfrac{4x^3 - 7x^2 + 2x - 1}{5x^3 + x^2 - 5x + 1000}$

b.) $\lim_{x\to-\infty} \dfrac{x^3 + 1}{x^2 + 2}$

c.) $\lim_{x\to\infty} \dfrac{1 - x}{x^3 + x}$

d.) $\lim_{x\to-\infty} \dfrac{\sqrt{x^2 - 2x}}{x + 2}$

e.) $\lim_{x\to\infty} (x - \sqrt{x^2 + 100}\,)$

f.) $\lim_{x\to\infty} \dfrac{e^{2x} + 1}{e^{2x} + 4}$

g.) $\lim_{x\to\infty} \dfrac{e^{x} + 1}{e^{2x} + 4}$

h.) $\lim_{x\to\infty} \dfrac{e^{2x} + 1}{e^{x} + 4}$

i.) $\lim_{x\to\infty} \dfrac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}}$

j.) $\lim_{x\to-\infty} (e^{2x} + e^{-x})$

k.) $\lim_{x\to-\infty} \dfrac{e^{x} + 1}{e^{x} + 4}$

l.) $\lim_{x\to-\infty} \dfrac{e^{-2x} + 1}{e^{-x} + 4}$

m.) $\lim_{x\to-\infty} \dfrac{e^{-x} + 1}{e^{-x} + 4}$

n.) $\lim_{x\to\infty} \dfrac{e^{x} + e^{3x}}{e^{2x} + e^{3x}}$

o.) $\lim_{x\to-\infty} \dfrac{e^{x} + e^{3x}}{e^{2x} + e^{3x}}$

p.) $\lim_{x\to\infty} (e^{x} - \sqrt{e^{2x} + e^{x}}\,)$

2.) Use the Squeeze Principle (Sandwich Theorem) to evaluate the following limits.

a.) $\lim_{x\to\infty} \dfrac{x \sin x}{x^2 + 1}$

b.) $\lim_{x\to\infty} e^{-x} \cos 100x$

c.) $\lim_{x\to-\infty} \dfrac{e^{2x} + \sin 5x}{2e^{x} + 1}$

3.) Evaluate the following limits.

a.) $\lim_{x\to0} \dfrac{\sin 3x}{5x}$

b.) $\lim_{x\to0} \dfrac{\sin^2 4x}{x^2}$

c.) $\lim_{x\to0} \dfrac{\tan x}{x^2 \cot x}$

d.) $\lim_{x\to0} \dfrac{1 - \cos 3x}{x}$

e.) $\lim_{x\to\pi} \dfrac{\sin(\tan x)}{\tan x}$

f.) $\lim_{x\to0} \dfrac{\sin 3x}{\sin x}$

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The following problem is for recreational purposes only.

4.) A snail is at the bottom of a well which is 100 feet deep. Each day it climbs up 5 feet and back down 4 feet. In how many days will the hapless snail reach the top of the well ?

Thanks to Dr. Kouba