Math 271 Test 1 Problems

HARD LIST

2.2 #5,6 Worst, don't get 2.3 #12 More practice may sove 2.3 # 13 Do one or two more, it's OK, see below 1st 2.4 # 11 – got right but don't understand why

For this section see notes 1/23/24

Find:

From class 9/23:

$$\lim_{x \to 2} \frac{3}{x-2}$$

Tables are now easy, but rounding is an issue.

From 2.2

#1 Practice another

Find this limit with a table, round to 5 decimal places

$$\lim_{x \to 0} \frac{9 \sin x}{x}$$

Use graph to find limit, with graph of vert asmyptote given. Easy.

HARD:

The next two I really don't understand yet. See class notes. Try also this video

With jump $Left \neq Right$, easy.

The graph of $f(x) = x + 1$ is shown in the figure. Find the largest δ such that if $0 < |x - 2| < \delta$ then $|f(x) - 3| < 0.4$.

$\delta =$ .40000 ✔

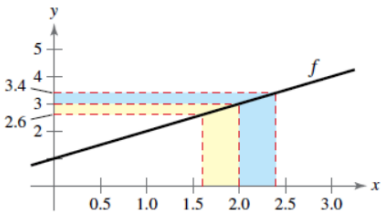

Figure 1: 2.1 #5

Set 2.1 practice another for #6 gives

Consider the following limit:

$$\lim_{x \to 2}(6x + 2)$$

1. Find the limit
2. Find $\delta > 0$ such that $|f(x) - L| < 0.01$ whenever $0 < |x - 2| < \delta$. Round to 5 decimal places.
3. Find $\delta > 0$ such that $|f(x) - L| < 0.005$ whenever $0 < |x - 2| < \delta$. Round to 5 decimal places.

2.2 # 8

What is $f(x) = 7$ as x approaches π? Easy.

2.3 1-2 substitution limits, easy.

#3 practice another

Easy, but do we need to show anything special for #3?

Given

$$f(x) = 2x^2 - 3x + 14, g(x) = \sqrt[3]{x + 4}$$

Find: 1. $\lim_{x \to 3} f(x)$

2. $\lim_{x \to 23} g(x)$
3. $\lim_{x \to 3} g(f(x))$

2.3 # 6 practice another easy, not here. # 8 also easy, not here # 9 also easy. This time needed to multiply by the conjugate. Here's that problem. Find:

$$\lim_{x \to 74} \frac{\sqrt{x + 7} - 9}{x - 74}$$

For this section see notes 1/24/24

2.3 # 10 practice another

Find the limit or DNE.

$$\lim_{\delta x \to 0} \frac{5(x + \delta x) - 5x}{\delta x}$$

Simplify and cancel to 5. Fairly easy.

$$\lim_{x \to 0} \frac{\sin x}{8x}$$

For this one fairly easy, recall special case of $\frac{\sin x}{x} = 1$

Number 12 Practice Another (Do via graph, table, and analytically)

REWORK this. Had issues.

Number 13 Practice Another:

Given $f(x) = 2x^2 - 3x$, find the limit as x approaches zero, given $\delta x = h$,

$$\lim_{h->0} \frac{f(x+h) - f(x)}{h}$$

Note that the correct answer at the end of the day equals f' or $\frac{dy}{dx}f$, so $4x - 3$, but done algebraically it's unclear when to finish crossing out. It looks like you end up crossing off all the h terms, and whatever is left still multiplies by h goes away because you sub zero at that point, thus:

(Note pandoc chokes on $\not{}$ below)

$$\frac{4xh + 2h^2 - 3h}{h} = 4x\not{h} + 2h - 3 = 4x - (2 \times 0) - 3 = 4x - 3$$

2.3 # 14 easy enough.

2.3 Practice another #15:

$$\lim_{x \to 1} ln(\frac{x}{e^{3x}})$$

Easy enough second time too.

On to exercise set 2.4

2.4 # 1,2,4,5,7,9,10 easy enough

Number 3 was this one:

$$\lim_{x \to \pi} 5\cot(x)$$

OK, DNE, can show from left and right using table to prove.

#6 Practice another:

Find the constant a such that fn is continuous on entire real number line.

$$f(x) = \begin{cases} 2x^2, x >= 1 \\ ax - 8, x < 1 \end{cases}$$

Pretty easy – set both sides equal @ 1 and substitue and solve.

Number 8 Describe intervals where fn is continuous:

$$f(x) = \sec(\frac{\pi x}{8})$$

Got wrong the first time, don't flip secant, just solve like this:

$$\frac{\pi x}{8} = \frac{\pi}{2}, \frac{3\pi}{2}, etc.$$

Number 11 of 2.4 is this. Find the limit if it exists).

$$\lim_{x \to 8-} \ln(8 - x)$$

Got DNE. Not sure how I got that though. At $x = 8$ that's certainly a problem, but approaching it?