Math 425: Collected Homework 4, due in lab, 10/5

Fall 2021

Directions: This homework is due on 10/5 at the start of your lab. Late work will not be accepted. Each homework will be worth 10 points, and at least ONE of these points is awarded for "professionalism", meaning that your work is prepared suitably, according to the guidelines below.

- Write your name and lab number at the top of your work.
- Label each problem clearly.
- Make sure that your work is clear. Show your work to gain full credit.
- Do not submit torn or sloppy paper.
- Leave blank space for comments from the grader.
- Staple your work.

1. Evaluate each limit, using methods from our course. State your answer clearly and show work suitably.
   - (a) $\lim_{x\to-\infty} \dfrac{4x^7 - \pi x^2}{ex^3 + x + 1}$.
   - (b) $\lim_{x\to-\infty} \dfrac{3x}{\sqrt{4x^2+5}}$
2. Evaluate each limit, using methods from our course. State your answer clearly and show work suitably.
   - (a) $\lim_{x\to\infty} x^4 - x^2$
   - (b) $\lim_{x\to\infty} x^5 + x^3$
   - (c) $\lim_{x\to-\infty} x^5 + x^2$
3. In this problem you are given the function $f(x) = 3x^2 + 4$. Complete the following outline to find the slope of the tangent line for f at $x = 1$.
   - (a) Assume that $h \neq 0$. Calculate the difference quotient below and simplify as far as possible.
     $$\frac{f(1+h) - f(1)}{(1+h) - 1}.$$
   - (b) Compute the limit to get the slope:
     $$\lim_{h\to 0} \frac{f(1+h) - f(1)}{(1+h) - 1}.$$