MATH 1120 Calculus II - Fall 2018 24 August 2018

Problem Set 0

Calculus I Review

This Active Review is meant as a single-session plan emphasizing the importance of mathematical communication through review materials. The student learning objectives of this Active Review are:

- students can identify and solve limit and derivative problems.
- students can clearly explain in their own words and diagrams to their peers their solution to a mathematical problem.

The instructor should divide students into groups of 3 and assign problems to students within those groups. The students are then to individually solve the assigned problems and write up a solution. Afterwards, students are to share the solution of the group member to their left to the group. Once all groups have finished sharing their solutions, the instructor should begin a classroom reflection on the activity. The discussion should be led to emphasize the importance of good mathematical communication to others and in solution responses.

- **Solve & Share** (20-30 min):
  - Students are in groups of 3, which can be labeled to facilitate group passing later.
  - Students are assigned a problem and are to solve their assigned problems individually. (10 min)
  - Each group aggregates their solutions and passes it to the next group.
  - Students presents a solution of a problem they did not solve from the solutions passed to their group. (10 min)
  - If there is time, students may grade each solution out of 10 possible points.
- **Classroom Discussion** (15-20 min):
  - What did you notice about the solutions? What was effective in the solution?
  - How did you explain your solution to Problem 1? Were there other explanations or different responses?
  - What was some difficulty/obstacle you needed to overcome in the presentation?
  - What are the goals of writing a mathematical solution?
  - What are some good strategies/checks/heuristics of writing a good solution?

1) Calculate $\dfrac{dy}{dx}$ for the curve given by $y = x^2 \sin x$.

2) Determine if the following limit exists or not. Compute the limit if it does exist:

$$\lim_{x \to 0} \sin(1/x).$$

3) Calculate $\dfrac{dy}{dx}$ for the curve given by $y = \ln(e^{3x} + 1)$.

4) Determine if the following limit exists or not. Compute the limit if it does exist:

$$\lim_{x \to \infty} \frac{x^2 + 3}{x^3 + 3x + 2}.$$

5) Calculate $\dfrac{dy}{dx}$ for the curve given by $x^3y - xy^3 = 1$.

6) Determine if the following limit exists or not. Compute the limit if it does exist:

$$\lim_{x \to 0} \frac{1 - x^2 - \cos x}{x \sin x}.$$