Math 199, Fall 2022
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9/6/22

<div align="center">**Preparation assignment 3 - Integration techniques**</div>

Estimated time: Less than 30 minutes.

Point value: 2 points.

Goals: On Tuesday, 9/6/22, our goal will be to practice solving integrals. The goal of this assignment is for you to collect various techniques that you know in one place.

Take out a separate sheet of paper and do the following.

1) <u>Substitution:</u> a.k.a. "u-substitution"; describe the method precisely, and then in your own words.

2) <u>Trig functions:</u>

$$\int \sin x \, dx = \qquad\qquad \int \cos x \, dx = \qquad\qquad \int \sec x \tan x \, dx =$$

$$\int \sec^2 x \, dx = \qquad\qquad \int \csc^2 x \, dx = \qquad\qquad \int \csc x \cot x \, dx =$$

3) <u>Integration by parts:</u> describe the method precisely, and then in your own words.

3.5) Integration by parts replaces one integral with a (hopefully easier) integral. In which types of situations can the "by parts" method still be useful even if the new integral you get is not any easier?

4) <u>Trigonometric substitution:</u> which integrals is this useful for, and what is your general strategy?