

# MAT 1575 Calculus II Halleck Fall 2018 Study Questions for Exam I v2

A complete set of attempts (done in pencil) and corrections (done in ink) carefully put together and organized (be sure to put your name, session day, date and topic on each sheet) earns you 10% bonus on your next midterm exam provided that your attendance is good. *Please be sure to turn this in at the **beginning** of the Exam.*

**Instructions for indefinite integrals:** i. Evaluate ii. **Check by differentiating!** iii. Determine the critical points for your resulting functions and use the first derivative test to classify them.

**Instructions for definite integrals:** i. Evaluate. If you use a **substitution** technique, **change the limits to the new variable**. (Do **not** substitute back to original variable!) Answers must be **exact**. ii. Find numeric approximations iii. Sketch graphs of the integrand by evaluating at the endpoints and at the midpoint. iv. Do your answers make sense numerically?

## Quiz 1 Antiderivatives and Indefinite Integration

a.  $\int (2x - 1)^3 dx$       b.  $\int \frac{\cos^2 x}{\sin x} dx$

## Quiz 2 The Definite Integral and the Fundamental Theorem of Calculus part 2

1. The sum

$$\int_{-2}^2 f(x) dx + \int_2^5 f(x) dx - \int_{-2}^{-1} f(x) dx$$

can be written as a single integral in the form

$$\int_a^b f(x) dx$$

Determine  $a$  and  $b$ .

2. Evaluate the definite integral  $\int_4^9 \frac{6x^2+8}{\sqrt{x}} dx$
3. Evaluate the following integral by interpreting it in terms of areas:  $\int_{-1}^2 |x| dx$ . Be sure to provide a graph and shade the appropriate regions.

## Quiz 3 Substitution

a.  $\int_0^1 x^2 (x^3 + 1)^3 dx$       b.  $\int_0^1 \frac{x}{\sqrt{x^2 + 9}} dx$       c.  $\int_0^1 \frac{3x^2}{\sqrt[3]{x^3 + 1}} dx$

## Quiz 4 Integration by Parts

a.  $\int x^2 \ln(x) dx$       b.  $\int x^2 e^{-x} dx$       c.  $\int x \cos(3x) dx$

## Quiz 5 Trig Integrals

a.  $\int_{-\pi/2}^{\pi/2} \sin^2 x \cos^7 x dx$       b.  $\int_{-\pi/4}^{\pi/4} \tan^2 x \sec^4 x dx$

## Quiz 6 Trigonometric Substitution

a.  $\int \frac{1}{x^2 \sqrt{36 - x^2}} dx$       b.  $\int \frac{\sqrt{x^2 - 9}}{x^4} dx$       c.  $\int \frac{9}{x^2 \sqrt{x^2 + 9}} dx$       d.  $\int \frac{6}{x^2 \sqrt{x^2 - 36}} dx$