

## MAC 2234: Survey of Calculus II

### Practice Exam # 1

The actual exam will be very similar to this practice test. You will have 120 minutes to complete the exam in Canvas. I suggest you attempt this under time restrictions to get the best practice possible.

- (1) Find the indefinite integral:

$$\int (4x^2 - x^{-3} + e^{2x}) dx$$

- (2) Find the indefinite integral:

$$\int \frac{3(\ln x)^2}{x} dx$$

- (3) Find an approximation of the area of the region  $R$  under the graph of  $f(x) = 8 - x^3$  on the interval  $[0, 2]$ . Use  $n = 4$  subintervals and choose the sample points to be the left endpoints of the subintervals; that is, find the left endpoint Riemann sum  $L_4$ .

- (4) Find the area of the region under the graph of  $f(x) = 4 - \sqrt{x}$  on the interval  $[0, 4]$ .

- (5) Find the indefinite integral:

$$\int x^2 \ln x dx$$

- (6) Evaluate the definite integral via integration by parts:

$$\int_1^3 xe^{-x} dx$$

- (7) Use the Trapezoidal Rule and Simpson's Rule to estimate the value of the definite integral to 4 decimal places:

$$\int_0^1 \sqrt{1+x^4} dx; \quad n = 4 \text{ subdivisions}$$

- (8) Find the area of the region under the curve  $y = 16/(x+1)^{3/2}$ ,  $x \geq 3$ .

- (9) Is the function  $f(x) = 0.006x(10 - x)$ ,  $0 \leq x \leq 10$  a probability density function on  $[0, 10]$ ?

- (10) The lifespan of a certain light bulb (in hours) is described by the probability density function

$$f(t) = 0.001e^{-0.001t}$$

- (a) Find the probability that a bulb fails within the first 200 hours.  
(b) Find the probability that a bulb burns for more than 800 hours.

- (11) Let  $\mu$  be the mean,  $v$  the variance, and  $s$  the standard deviation of the random variable  $X$  associated to the probability density function  $f(x) = 64/x^5$ ,  $2 \leq x < \infty$ . Compute  $\mu + v + s$ .
- (12) Find the second order Taylor polynomial of  $f(x) = \sqrt{1+x}$  at  $x = 3$ .