

MATH 20C: FUNDAMENTALS OF CALCULUS II
EXAM #2

Name _____

Please complete the following problems in the space provided. You may use an approved calculator. Please include all relevant intermediate calculations and explain your work when appropriate. Be neat and orderly in your answer. Each problem is worth 5 points.

Problem 1. Find the area of the region between $y = x^2$ and $y = 3x - 2$ from $x = 0$ to $x = 2$. Graph the area of this region.

Problem 2. Evaluate the integral

$$\int x^{-2} \ln x \, dx.$$

Problem 3. Evaluate the integral

$$\int_0^{\pi} 3 \cos(2x) \, dx.$$

Problem 4. The amount of drug in the body of a laboratory rat at time t is given by $D(t) = 3e^{-0.2t}$ where D is in cubic centimeters (cc's) and time t is in hours. What is the average amount of drug in the rat's body over the first 5 hours?

Problem 5. Determine if the following given improper integral converges or diverges. If it converges, calculate its value.

$$\int_2^{\infty} \frac{2}{x^4} dx.$$

Problem 6. The oil from offshore drilling produces a continuous stream of income of $R(t) = 1000 - 50t$ dollars per year for t years. The revenue is deposited daily into a savings account bearing interest at a rate of 5%. Find the future value of the income stream after the first 20 years of operation.