

**Math 0120
Examination #3
Sample**

Name (Print) _____ Student ID # _____

Signature _____ Score _____

TA (Circle one)

Instructions:

1. Clearly print your name and sign your name in the space above.
2. There are 8 problems, each worth the specified number of points, for a total of 100 points. There are also two extra-credit problem worth 5 points and 10 points.
3. Please work each problem in the space provided. Extra space is available on the back of each exam sheet. Clearly identify the problem for which the space is required when using the backs of sheets.
4. Show all calculations and display answers clearly. Unjustified answers will receive no credit.
5. Write neatly and legibly. Cross out any work that you do not wish to be considered for grading.
6. **Calculators may not be used. All derivatives and integrals are to be found by learned methods of calculus.**

1. (12 pts.) Let $f(x) = \frac{1}{x^2}$.

(a) Approximate the area under the curve $y = f(x)$ from **a = 1 to b = 7** using a Riemann sum with 2 left rectangles. (Write the sum; you need not evaluate it.)

(b) Find the exact value of the area under the curve $y = f(x)$ from **a = 1 to b = 7** by evaluating an appropriate definite integral using the Fundamental Theorem of Integral Calculus

2. (21 pts.) Find the following integrals:

(a) $\int (\sqrt[3]{x^5} + e^{-2x} + \frac{1}{\pi}) dx$

(b) $\int \frac{x-1}{x^2} dx$

(c) $\int_{-3}^{-1} (e - x^{-1}) dx$

3. (16 pts.) Use substitution to find the following integrals:

(a) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

(b) $\int_1^2 \frac{3x^2}{\sqrt{x^3+8}} dx$

4. (6 pts.) Find the average value of $f(x) = x^3$ on $[0,2]$.