

**Math 0120
Examination #3
Sample**

Name (Print) _____ **PeopleSoft #** _____

Signature _____ **Score** _____.

TA (Circle one)

Instructions:

1. Clearly print your name and PeopleSoft number 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 is also an extra-credit problem worth up to 5 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 **No calculators, headphones, tables, books, notes, or computers may be used. All derivatives are to be found by learned methods of calculus.**

1. Let $f(x) = \frac{1}{x}$.

(a) (5 pts.) Approximate the area under the curve $y = f(x)$ from $a = 1$ to $b = 13$ using a Riemann sum with 3 left rectangles. (Write the sum; you need not evaluate it.)

(b) (5 pts.) Find the exact area under the curve $y = f(x)$, $1 \leq x \leq 13$, using the Fundamental Theorem of Calculus.

2. (15 pts.) Find the following integrals:

(a) $\int (\sqrt[4]{x^3} + \frac{1}{e}) dx$

(b) $\int_{-3}^{-1} (\pi - x^{-1}) dx$

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

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

(a) $\int (x^2 - 1)(x^3 - 3x)^{-2} dx$

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

4. (6 pts.) For the demand function $D(p) = \sqrt{175 - 3p}$

(a) Find the elasticity of demand, $E(p)$.

(b) Is demand elastic, inelastic, or unitary at $p = 50$?