

## Extra Credit for Exam 2

**Due Tuesday, March 27, 7:30 p.m.** No late assignments will be accepted.

**Directions:** Show all work for full credit. Simplify all answers completely. Clearly indicate all answers. You are allowed to use the textbook, your class notes, homework problems, and exams as references.

**Work independently.** You are only allowed to ask your instructor for this course for clarification of problems. Do not work with classmates, tutors, family members, friends, enemies, online forums, etc. If you work with any person other than the instructor, you will receive zero points for this assignment, as well as other possible consequences for cheating.

Do the problems in order on a separate sheet of paper. Be sure to staple multiple page assignments and tear off rough edges before handing in this assignment.

This assignment is worth a maximum of 15 points. The points you earn will be added to your score from Exam 2, replacing your original score for Exam 2.

**Each question is worth 3 points.**

1. The potential energy,  $U$ , of a particle moving along the  $x$ -axis is given by

$$U = b \left[ \left( \frac{a}{x} \right)^2 - \frac{a}{x} \right],$$

where  $a$  and  $b$  are positive constants and  $x > 0$ . What value of  $x$  minimizes the potential energy? What is the minimum potential energy?

2. Calculate and simplify the derivative of

$$f(x) = \frac{\ln x^3}{e^x}.$$

3. Calculate and simplify  $\frac{dy}{dx}$  for

$$2x + 3xe^y + y^2 = 4xy.$$

4. A kite is at a constant height of 36 feet, and is being blown horizontally away from the kite flier at a constant rate of 15 feet per minute. At what rate is the sting being played out when 60 feet of string is out? Assume that the kite string is taut.
5. The demand for a product is given by  $(p + 2)\sqrt{q + 2} = 800$ . Find the elasticity of demand when  $p = 48$ . How would a price increase affect the revenue?