Math 120
Practice Exam D
November 2025

- This exam is a collection of old Exam 2 questions (sources noted with each problem).
- Solutions to source exams are available in the Math 120 archive.
- This should NOT be your only source of studying but I hope this helps.
- Instructions are given below as a reminder of what exams look like.

Name _____

Student ID #_____

Section _____

HONOR STATEMENT

"I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam."

SIGNATURE:_____

- This exam consists of this cover, four pages of questions, and a blank scratch page.
- You will have 50 minutes.
- You may use a Ti-30x IIS calculator (no other models) and one 8.5×11 inch sheet of handwritten notes (front and back).
- Turn your cell phone OFF and put it away for the duration of the exam. You may not listen to headphones or earbuds during the exam.
- **You must show your work.** Correct answers with no supporting work may receive no credit.
- Leave answers in exact form or round to three digits after the decimal, unless otherwise specified.
- **Do not write within 1 cm of the edge.** Exams are scanned for grading.
- There may be multiple versions. Do not cheat. If your answer matches another version with no supporting work, you will receive a zero and be reported.
- Alternate text for any image is given at the bottom of the page where the image appears.

GOOD LUCK!

Autumn 2016 Ostroff Exam 2 Problem 3

1. The rent for a one-bedroom apartment in Beattle is growing exponentially.

   (a) In the year 2000, the rent in Beattle was \$1020, and it increases by 2.3% per year.
   Write a function $f(t)$ for the rent in Beattle t years after 2000.

   (b) The average monthly rent in Tickoma is also growing exponentially.
   In the year 2007, the rent in Tickoma was \$500 less than the rent in Beattle.
   In the year 2016, the rent in Tickoma is \$1000.
   Write a function $g(t)$ for the rent in Tickoma t years after 2000.

   (c) When will the rents in Beattle and Tickoma be equal? (Round your answer to the nearest year.)

Autumn 2016 Ostroff Exam 2 Problem 2

2. Gomba is on a diet. His weight is a linear-to-linear rational function of time.

   Right now, Gomba weighs 21 pounds.

   In 1 month, he will weigh 20.5 pounds.

   In 7 months, he will weigh 18.75 pounds.

   In the long run, what will Gomba's weight approach?

   (Assume Gomba will live forever.)

Autumn 2008 Loveless Exam 2 Problem 2

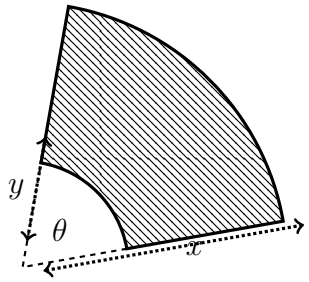
3. (a) Suppose $f(x) = ax + 5$ and $f(f(x)) = 4x - 5$.

   Find the value of a.

   (b) Find the inverse of $f(x) = x^2 - 4x$ where the domain is restricted to $x \leq 2$.

Modified from Autumn 2016 Ostroff Exam 2 Problem 4 (geometry only; no Chapter 7 optimization)

4. A *polar rectangle* is the region bounded by two concentric circular arcs and two rays through the center. A diagram is shown below:



Here x is the outer radius, y is the inner radius, and θ is the central angle in radians.

Note: This problem has been modified from the original exam.

(a) Suppose $x = 5$ meters, $y = 2$ meters, and $\theta = 1.4$ radians.

Compute both the **area** and the **perimeter** of the polar rectangle.

(b) Now suppose y is fixed, but x and θ may vary.

Write formulas for the:

- **Area** in terms of x, y, and θ.
- **Perimeter** in terms of x, y, and θ.

(c) Suppose $y = 2$ meters and $\theta = 1$ radian. The **area** of the polar rectangle is 6 square meters.

i. Solve for the value of x.

ii. Then compute the corresponding perimeter.

Alt text: Shaded annular sector between radii y and x with opening angle θ; rays from the origin bound the sector.