Math 102, Fall 2022 — Exam 2 revisions

Mount Holyoke College

Due December 5 at 5:00 pm

Instructions. As part of Exam 2, we will have a process for exam corrections. This will give you an opportunity to learn from mistakes and continue to understand the material more deeply. It will also allow you to earn back some credit on missed problems. For each problem that you lost points on, I will ask you to:

a. Redo the problem and give a correct solution.

b. Write a short summary of went wrong in your original solution and how you addressed the issue. This is open ended and it doesn't have to be a long summary (a few sentences is fine), but it should be reflective and written in complete sentences.

c. Do the corresponding problem from the list below.

The corrections are optional, but will give you a chance to earn back up to 25% of points missed. You can work with others and get help from me and TA's, as well as use the book and class notes. They will be due on Gradescope on December 5 at 5:00 pm. If your score was below 35 points originally, I'll ask you to come to office hours or make a short appointment with me so that we can look through your exam.

Problem 1. Compute the following integrals.

a. $\int x^2 \sin(3x^3 + 2)\, dx$

b. $\int_0^1 x\sqrt{x^2 + 4}\, dx$

c. $\int_0^{\pi/2} x \sin x\, dx$

d. $\int 3x e^{2x}\, dx$

e. $\int x^2 \ln x\, dx$

Problem 2. Evaluate the following integral or show that it diverges.

$$\int_3^\infty \frac{1}{(x-3)^2}\, dx$$

Problem 3. Evaluate the integral

$$\int \frac{x+2}{(x+3)^2(x-4)^2}\, dx$$

Problem 4. Consider the region bounded by the curves

$$y = x, \quad y = 4 - x^2.$$

a. Find the intersection points of the curves.

b. Set up but do not evaluate an integral with respect to x for the area of this region.

c. Set up but do not evaluate an integral with respect to y for the area of this region.

Problem 5. Consider the solid formed by revolving the region bounded by

$$x = y^2, x = 0, x = 4$$

about the following axes. Use the **disk or washer method** to set up an integral for the volume of the solids that result. Do not evaluate the integrals.

a. Revolved around $x = 2$

b. Revolved around $y = 3$

Problem 6. Consider the solid formed by taking the region bounded by $y = x, y = 2 - x$ and $x = 0$ (region shown below) and revolving it about the vertical axis $x = 2$. Use the **shell method** to set up an integral for the volume of this solid. Do not evaluate the integral.