Calculus II. Review 1.
Also study quizzes, homework, and examples from notes!

You should be able to do each problem both with and without a calculator. The test will be in two parts, and one part will be taken without a calculator.

For each integration problem, you must show the set-up and all the steps.

1. Find the area between the curves \( y = x^2 - 2x, \ y = x + 4, \) and \( x = 0. \)
2. Find the area between \( y = x^3, \ y = e^x, \ x = -1, \ x = 0. \)
3. Find the area between \( y = x - 1 \) and \( y^2 = 2x + 6. \)
4. Find the area between \( y = \tan x \) and \( y = 2\sin x \) for \( 0 \leq x \leq \pi/3. \)
5. Just set up the integral for the area between \( y = \cos x \) and \( y = \sin 2x \) for \( 0 \leq x \leq \pi/3. \)
6. Find the volume of the region inside \( x = 0, \ y = 3x + 1, \ x = 2, \ x = y^2 \) rotated around the \( x \)-axis.
7. Find the volume of the region inside \( x = 0, \ x = 1, \ y = 2x, \ y = e^{x^2} \) rotated around the \( y \)-axis.
8. Just set up the integral for the volume of the region inside \( x = 0, \ x = 1, \ y = 2x, \ y = e^{x^2} \) rotated around the \( x \)-axis.
9. Find the volume of the region inside \( y = x^3, \ y = 0, \ x = 1 \) rotated around the line \( x = 2. \)
10. Just set up the integral for the volume of the region bounded by: \( y = 0, \ y = 1, \ y = x, \ y = \sqrt{\ln(x)}; \) rotated around the \( y \)-axis.
11. Find the average value of the function \( f(x) = \frac{x + 7}{\sqrt{x}} \) on the interval \([0, 3].\)
12. Evaluate the definite integral. \( \int_1^2 x^3 \ln(x) \, dx \)
13. Find the indefinite integral. \( \int e^x \sin(2x) \, dx \)
14. Find the indefinite integral. \( \int \sin^7 x \cos^6 x \, dx \)
15. Find the indefinite integral. \( \int \sin^8 x \cos^5 x \, dx \)
16. Find the indefinite integral. \( \int x^2 e^x \, dx \)
17. Find the indefinite integral. \( \int \sqrt{16 - x^2} \, dx \)
18. Find the indefinite integral. \( \int \frac{1}{x^2 \sqrt{x^2 - 16}} \, dx \)