

Math 232 Calculus 2 Fall 12 Sample midterm 1

- (1) Find $\int x \sin(-2x^2) dx$.
- (2) Find $\int \frac{1}{2} x^2 \sqrt[3]{1-x^3} dx$.
- (3) Find the area between the two curves $y = \sin(x/2)$ and $y = 2 \cos(x)$ on the interval $[0, \pi]$.
- (4) Consider the ellipsoid $4x^2 + 4y^2 + z^2 = 1$.
 - (a) Write down a formula for the area of the horizontal cross section at height z .
 - (b) Use your answer above to find the volume of the ellipsoid.
- (5) Find the average value of $e^{-x/2}$ on the interval $[-1, 3]$.
- (6) Use discs to find the volume of the object formed by rotating the triangle with vertices $(1, 0)$, $(1, 1)$ and $(2, 0)$ about the y -axis.
- (7) Consider the subset of the plane lying below the curve $y = x^2 - 4x$ and above the x -axis. Use shells to find the volume of the object formed by rotating this region about the x -axis.
- (8) Find an upper bound for the error in using the trapezoid method with 10 trapezoids to estimate $\int_0^2 x e^{-2x} dx$. How many trapezoids do you need to find the answer to four decimal places? Recall: the error bound for the trapezoid method is $K_2(b-a)^3/(12N^2)$, where K_2 is an upper bound on the absolute value of the second derivative.
- (9) Find $\int x^2 \ln(x) dx$.
- (10) Find $\int e^{-2x} \cos(3x) dx$.