Math 232 Calculus 2 Fall 17 Sample midterm 1

(1) Find $\int -2x^2 \cos(-2x^3)\ dx$.

(2) Find $\int 3x^3 \sqrt[5]{1-x^4} dx$.

(3) Find the area between the two curves $y = \sin(2x)$ and $y = \cos(x)$ on the interval $[\pi/2, \pi]$.

(4) Consider the ellipsoid $16x^2 + y^2 + z^2 = 1$.
   (a) Write down a formula for the area of the vertical cross sections perpendicular to the x-axis for a fixed value of x.
   (b) Use your answer above to find the volume of the ellipsoid.

(5) Find the average value of $e^{-x/4}$ on the interval $[-2, 2]$.

(6) Use discs to find the volume of the object formed by rotating the triangle with vertices $(2, 0), (1, 2)$ and $(1, 0)$ about the y-axis.

(7) Consider the subset of the plane lying below the curve $y = 2x^2 - 6x$ 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 $\int x \ln(x+1) dx$.

(9) Find $\int e^{-3x} \cos(2x) dx$.

(10) Find $\int xe^x \sin x dx$

(11) Find $\displaystyle\int_{-\pi/2}^{0} \sin^2(x)\cos^3(x) dx$.

(12) Find $\displaystyle\int \sin(3x)\cos(7x) dx$.