Math 35, Homework 3 on Sections 15.1, 15.2, 15.3
due Wed, Feb 26 at the start of class.

---

(1) Let $f(x,y) = 1 + xy - y^2$ and $R = [1,7] \times [0,4]$. In other words, R is the rectangle containing all points (x,y) with $1 \leqslant x \leqslant 7$ and $0 \leqslant y \leqslant 4$. Use a Riemann sum with $m = 3$ and $n = 2$ (so breaking $[1,7]$ into 3 equal pieces and $[0,4]$ into 2 equal pieces), and sample points in the middle (midpoint rule), to estimate:

$$\iint_R f(x,y)\,dA$$

(2) For $R = [3,6] \times [-1,7]$, find $\iint_R 2\,dA$ just by identifying it as the volume of a certain solid.

(3) For $R = [0,5] \times [0,3]$, find $\iint_R (5-x)\,dA$ by identifying it as the volume of a wedge-shaped solid.

(4) Calculate the iterated integral:

$$\int_{\pi/6}^{\pi/2} \int_{-1}^{5} \cos y\,dx\,dy$$

(5) Use an iterated integral to calculate the double integral $\iint_R f(x,y)\,dA$ from question (1) exactly.

(6) Find

$$\iint_R \frac{x}{1+xy}\,dA, \qquad R = [0,1] \times [0,1].$$

(7) Find the volume of the solid enclosed by the surface

$$z = 1 + e^x \sin y$$

and the planes $x = \pm 1$, $y = 0$, $y = \pi$ and $z = 0$.

(8) Let D be the region bounded by $y = \sqrt{x}$ and $y = x^2$. Compute: $\iint_D (x+y)\,dA$

(9) Sketch the region of integration for

$$\int_0^1 \int_x^1 e^{x/y}\,dy\,dx$$

and then evaluate this integral by using your picture to reverse the order of integration.