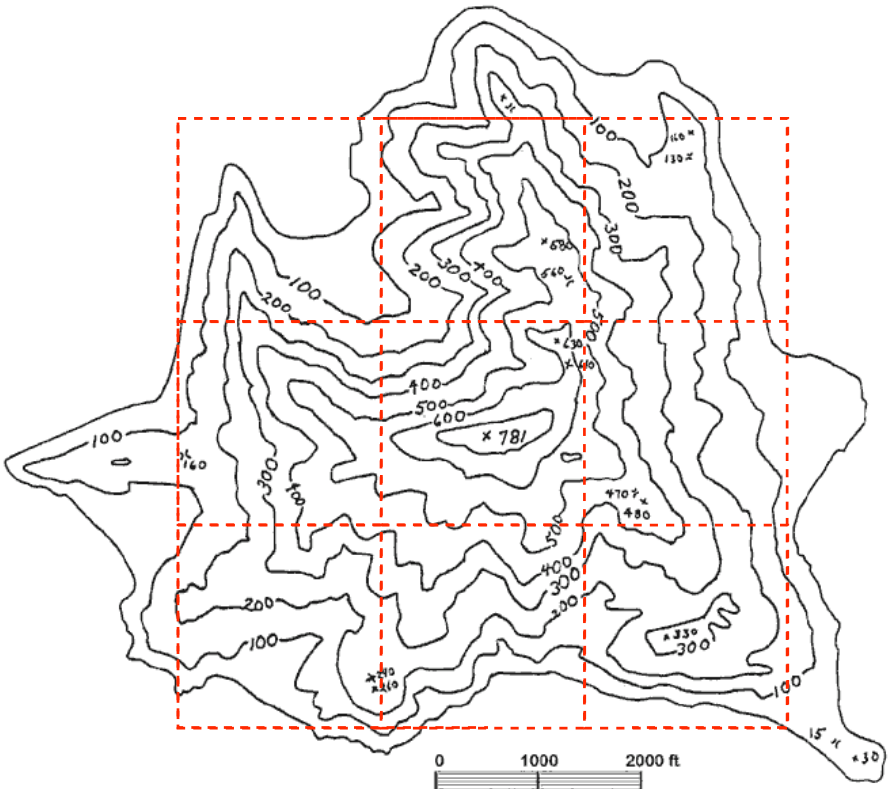
Assignment 6, due Wednesday, March 2nd

(1) Estimate the volume of the solid bounded by $z = 0$, $z = x + 2y^2$, and within the rectange $x \in [0, 2]$, $y \in [0, 4]$ by using a Riemann sum with $n = m = 2$ and use the value of the function in the lower-right corner of each sub-rectangle. Repeat the estimate using the midpoint of each rectangle - which of these do you expect to be more accurate?

(2) Estimate the volume of Angel Island, CA, in cubic feet by using the midpoint rule with a 3 by 3 subdivision as shown on the following map. The squares in the subdivision are 2000 feet square, and elevations are also shown in feet.



(3) Find the value of the integral $\int \int_R 2 \, dA$, where $R = \{(x, y) | -3 \leq x \leq 3, \ -2 \leq y \leq 2\}$ by identifying it as the volume of a solid.

(4) Find the value of the integral $\int \int_R 8 - x \ dA$, where $R = \{(x, y) | 4 \leq x \leq 8, \ -1 \leq y \leq 1\}$ by identifying it as the volume of a solid.

(5) Calculate the following double integrals

(6) $\displaystyle\int_0^2 \int_{-1}^1 (x^2 + y^2) \ dy \ dx$

(7) $\displaystyle\int_2^4 \int_0^1 (2x + \sqrt{y}) \ dy \ dx$

(8) $\displaystyle\int_1^2 \int_0^1 \frac{ye^y}{x}\, dy\, dx$

(9) $\displaystyle\int\int_R 2xye^{x^2y}\, dA,\ R = [0,2] \times [0,1].$

(10) Find the volume of the solid bounded by the planes $x = 4$, $y = 2$, the coordinate planes, and the elliptic paraboloid $z = 2 + (x-1)^2 + 8y^2$.

(11) Compute the average value of the function $f(x,y) = e^x\sqrt{y+e^x}$ on the rectangle $R = [0,1] \times [0,2]$.

(12) Compute the average value of the function $f(x,y) = xy$ on the triangle with vertices $(0,0)$, $(3,0)$, and $(1,2)$.