

1. Introduce notation and write an expression to calculate the average productivity of the agricultural land in Merced county as a double integral. Specify the definition of the function to be integrated and the domain over which it must be integrated. (You do not need to provide a formula of the type  $f(x, y) = x^2 + y$ , rather just explain what the functions and variables would stand for).
2. A rectangular piece of brownie is three inches wide by two inches across. When seen from above, the brownie is aligned with the  $x$  and  $y$  axes and has a corner at the origin. The thickness of the frosting at a point is equal to one twentieth of the square of the horizontal distance from that point to the  $z$ -axis (vertical). What is the average thickness of frosting on the brownie?
3. Using iterated integrals, evaluate the volume above the triangle with vertices  $(0, 0, 0)$ ,  $(2, 1, 0)$  and  $(3, 0, 0)$  (in the  $xy$ -plane) and below the surface  $z = 2xy$ .