

## Quiz 10

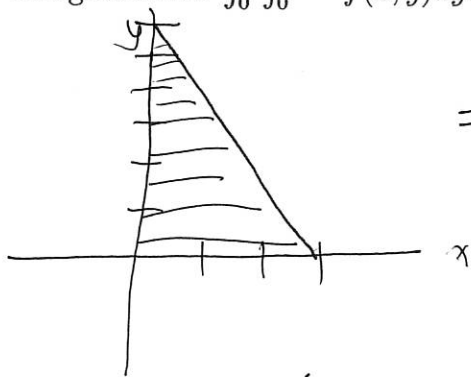
MATH 210, CALCULUS III, SUMMER 2015

NAME:

**Problem 1.** Compute the average value of the function  $f(x, y) = 4 - x - y$  over the region  $R = \{(x, y) : 0 \leq x \leq 2, 0 \leq y \leq 2\}$ .

$$\begin{aligned} \frac{1}{2 \cdot 2} \int_0^2 \int_0^2 4 - x - y \, dy \, dx &= \frac{1}{4} \int_0^2 \left. 4y - xy - \frac{y^2}{2} \right|_0^2 \, dx \\ &= \frac{1}{4} \int_0^2 \left( 4(2) - 2x - \frac{2^2}{2} - \left( 4(0) - 0x - \frac{0^2}{2} \right) \right) \, dx \\ &= \frac{1}{4} \int_0^2 6 - 2x \, dx = \frac{1}{4} \left. (6x - x^2) \right|_0^2 = \frac{1}{4} (6(2) - 2^2) - \frac{1}{4} (6(0) - 0^2) \\ &= \frac{1}{4} (12 - 4) = \frac{8}{4} = 2 \end{aligned}$$

**Problem 2.** Sketch the region over which we are integrating and reverse the order of integration for  $\int_0^3 \int_0^{6-2x} f(x, y) \, dy \, dx$ .



$$= \int_0^6 \int_0^{-\frac{1}{2}y+3} f(x, y) \, dx \, dy$$

$$y = 6 - 2x$$

$$y - 6 = -2x$$

$$x = -\frac{1}{2}y + 3$$