

Math 311, Fall 2016
Assignment 7, due Wednesday, October 19

Hand in all of the following problems:

- 5.5: 18, 25, 32, 34, 38, 40
- 5.6: 22, 28, 32, 33, 34
- Consider a 2 dimensional region D to be *symmetric about the y -axis* if (x, y) is in D whenever $(-x, y)$ is in D . In other words, reflection in the y -axis does not change the region D . In these two problems, assume that D is symmetric about the y -axis.
 - a. Suppose $f(x, y)$ is even in x in that $f(-x, y) = f(x, y)$ for any (x, y) in D . Let D_+ denote the intersection of D with the half plane $x \geq 0$, in other words, $D_+ = \{(x, y) : (x, y) \in D \text{ and } x \geq 0\}$. Use the change of variables formula to explain why

$$\iint_D f(x, y) dA = 2 \iint_{D_+} f(x, y) dA.$$

- b. Suppose $f(x, y)$ is odd in x in that $f(-x, y) = -f(x, y)$ for any (x, y) in D . Use the change of variables formula to explain why

$$\iint_D f(x, y) dA = 0.$$

Notes:

- For 32-34 in §5.6, begin by computing $\text{Vol}(W)$ and solve for δ using that $\delta = M/\text{Vol}(W)$. Then derive the formula

$$\iiint_W \frac{dV}{x^2 + y^2 + (z - r)^2} = 2\pi \int_a^b \left(\frac{\rho}{r}\right) (\rho + r - |\rho - r|) d\rho$$

by converting the integral on the right to spherical coordinates.

Reading: Finish reading 5.5, 5.6, start Chapter 6.

Problems to do on your own:

- 5.5: 15, 17, 27, 29, 31, 35, 37, 39
- 5.6: 11, 13, 15, 19, 21, 23, 25, 27, 29, 31,