MA 213 Worksheet #14

Section 15.1 and 15.2

1 Calculate the iterated integral.

(a) *15.1.15* $\displaystyle\int_1^4 \int_0^2 (6x^2y - 2x)\, dy\, dx$

(b) *15.1.17* $\displaystyle\int_0^1 \int_1^2 (x + e^{-y})\, dx\, dy$

2 *15.1.37* Find the volume of the solid that lies under the plane $4x + 6y - 2z + 15 = 0$ and above the rectangle $R = \{(x, y)| \quad -1 \le x \le 2, -1 \le y \le 1\}$

3 *15.2.13* Evaluate the double integral in two ways.

$$\iint_D x\, dA,$$

D is enclosed by the lines $y = x$, $y = 0$, $x = 1$.

4 *15.2.15* Set up iterated integrals for both orders of integration. Then evaluate the double integral using the easier order and explain why its easier.

$$\iint_D y\, dA$$

D is bounded by $y = x - 2$, $x = y^2$

5 *15.2.23* Find the volume of the solid that is under the plane $3x + 2y - z = 0$ and above the region enclosed by the parabolas $y = x^2$ and $x = y^2$.

Additional Recommended Problems

6 *15.1.9* Evaluate the double integral by first identifying it as the volume of a solid.

$$\iint_R \sqrt{2}\, dA, \quad R = \{(x, y) \mid 2 \le x \le 6,\ -1 \le y \le 5\}$$

7 *15.1.41* Find the volume of the solid enclosed by the surface $z = 1 + x^2ye^y$ and the planes $z = 0$, $x = \pm 1$, $y = 0$, and $y = 1$.

8 *15.2.1* Evaluate the iterated integral: $\displaystyle\int_1^5 \int_0^x (8x - 2y)\, dy\, dx$

9 *15.2.11* Draw an example of a region that is

(a) type I but not type II;

(b) type II but not type I.

10 *15.2.53* Sketch the region of integration, the evaluate the integral by reversing the order of integration.

$$\int_0^1 \int_{\sqrt{x}}^1 \sqrt{y^3 + 1}\, dydx.$$