Homework Set 1

Due: Wednesday June 29th

Section 15.2

13: Calculate the iterated integral: $\int_0^2 \int_0^\pi r\sin^2(\theta)d\theta dr$.

19: Calculate the double integral: $\iint_R x\sin(x+y)dA$, where $R = [0, \pi/6] \times [0, \pi/3]$.

26: Find the volume of the solid that lies under the hyperbolic parablologid $z = 3y^2 - x^2 + 2$ and above the rectangle $R = [-1, 1] \times [1, 2]$.

31: Find the volume of the solid enclosed by the parabloid $z = 2 + x^2 + (y-2)^2$ and the planes $z = 1$, $x = 1$, $x = -1$, $y = 0$ and $y = 4$.

Section 15.3

8: Evaluate the double integral:$\iint_D \frac{y}{x^5+1}dA$, where $D = \{(x, y)|0 \leq x \leq 1, 0 \leq y \leq x^2\}$.

14: Evaluate the double integral:$\iint_D xydA$, where D is enclosed by the curves $y = x^2$, $y = 3x$.

19: Evaluate the double integral:$\iint_D y^2dA$, D is the triangular region with vertices (0,1) (1,2), (4,1).

29: Find the volume of the solid enclosed by the cylinders $z = x^2$, $y = x^2$ and the planes $z = 0$, $y = 4$.

52: Evaluate the integral by changing the order of integration: $\int_0^1 \int_x^1 e^{x/y}dydx$.

Section 15.4

11: Evaluate the integral by changing to polar coordinates: $\iint_D e^{-x^2-y^2}dA$, where D is the region bounded by the semicircle $x = \sqrt{4-y^2}$ and the y-axis.

17 : Use a double integral to find the area of the region inside the circle $(x-1)^2 + y^2 = 1$ and outside the circle $x^2 + y^2 = 1$.

25(ice cream problem): Use polar coordinates to find the volume of the solid above the cone $z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = 1$.

31: Evaluate the iterated integral by converting to polar coordinates: $\int_0^1 \int_y^{\sqrt{2-y^2}} (x + y)dxdy$.