Math 324, Homework 1

Stewart 15.2 For 7, 9, 13, and 22, calculate the value of the double integral.

#7. $\int_{-3}^{3}\int_{0}^{\pi/2}(y+y^2\cos x)dxdy.$

#9. $\int_{1}^{4}\int_{1}^{2}(\frac{y}{x}+\frac{x}{y})dydx.$

#13. $\int_{0}^{2}\int_{0}^{\pi} r\sin^2\theta d\theta dr.$

#22. $\iint_R \frac{1}{1+x+y}\,dA, R=[1,3]\times[1,2].$

#29. Find the volume of the solid enclosed by the surface

$$z = x\sec^2 y$$

and the planes

$$z=0, x=0, x=2, y=0, y=\pi/4.$$

Stewart 15.3 For 51 and 53, evaluate the double integral by reversing the order of integration.

#6. Evaluate the integral. $\int_{0}^{1}\int_{0}^{e^v}\sqrt{1+e^v}dwdv.$

#19. $\iint_D y^2 dA$, where D is the triangular region with vertices $(0,1),(1,2),(4,1)$.

#51. $\int_{0}^{4}\int_{\sqrt{x}}^{2}\frac{1}{y^3+1}dydx.$

#53. $\int_{0}^{1}\int_{\arcsin(y)}^{\pi/2}\cos(x)\sqrt{1+\cos^2(x)}dxdy.$

Stewart 15.4

#5. Sketch the region whose area is given by the integral and evaluate the integral. $\int_{\pi/4}^{3\pi/4}\int_{1}^{2} rdrd\theta.$

#11. Evaluate the integral by writing it in 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.

#18. Use a double integral to find the area of the region inside the cardioid $r=1+\cos\theta$ and outside the circle $r=3\cos\theta$.

#26. Use polar coordinates to find the volume of the solid bounded by the paraboloids $z=3x^2+3y^2$ and $z=4-x^2-y^2$.