Math 303, Worksheet #10 **Name: Solutions**
Fall 2008

Here are some of your homework problems from the text.

Section 16.2

Compute each of the following:
[You should be able to do these without Maple, but you can always use Maple to check your work].

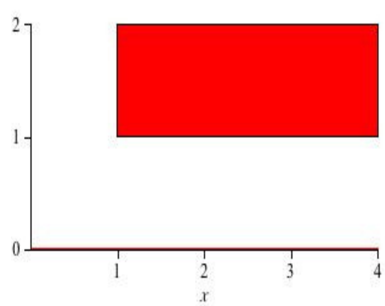
1. $\displaystyle\int_0^3 \int_0^4 (4x + 3y)\, dx\, dy$

2. $\displaystyle\int_0^2 \int_0^3 (x^2 + y^2)\, dy\, dx$

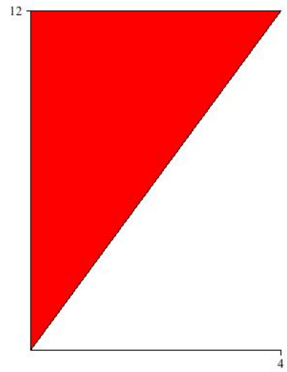
3. $\displaystyle\int_0^3 \int_0^2 (6xy)\, dy\, dx$

For each of the following regions, set up the iterated integral for $\int_R f\, dA$.
[The important part is finding the limits of integration for x and y. Start by finding the equation for each of the boundaries, then set up inequalities for x and y].

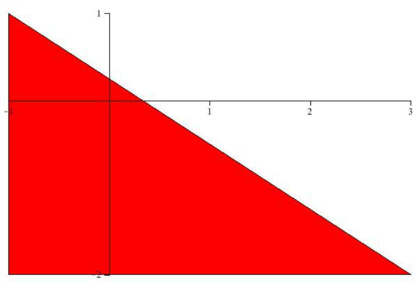
5.



6.



7.



Sketch the region of integration, and compute the integral.

12. $\int_0^2 \int_0^x e^{x^2}\, dy\, dx$

13. $\int_1^5 \int_x^{2x} \sin x\, dy\, dx$

Compute:

17. $\int_R \sqrt{x+y}\, dA$, where R is the rectangle $0 \le x \le 1$, $0 \le y \le 2$.

18. Compute the integral in Exercise 17 using the other order of integration.

19. Compute $\int_R (5x^2+1)\sin(3y)\,dA$, where R is the rectangle $-1 \le x \le 1$, $0 \le y \le \frac{\pi}{3}$.

Section 16.3

In section 16.3 we see that the idea of the double integral of a function of two variables extends to a triple integral of a function of three variables. In class tomorrow I'll talk about applications, but for now you can work on the computations.

Set up and compute the integral of the given function over the region W.

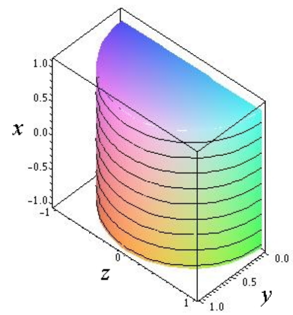
1. $f(x,y,z) = x^2 + 5y^2 - z$, W is the rectangular box $0 \le x \le 2$, $-1 \le y \le 1$, $2 \le z \le 3$.

2. $h(x,y,z) = ax + by + cz$, W is the rectangular box $0 \le x \le 1$, $0 \le y \le 1$, $0 \le z \le 2$.

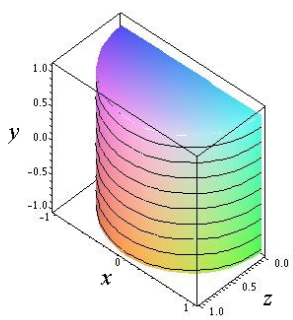
3. $f(x,y,z) = e^{-x-y-z}$, W is the rectangular box with corners at $(0,0,0)$, $(a,0,0)$, $(0,b,0)$, $(0,0,c)$.

Sketch the region of integration:

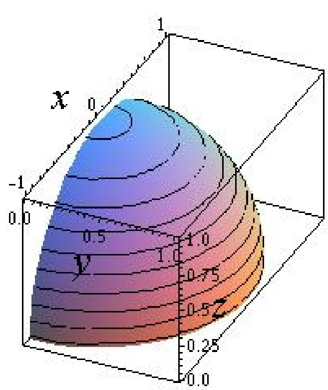
5. $\int_0^1 \int_{-1}^1 \int_0^{\sqrt{1-z^2}} f(x,y,z)\,dy\,dz\,dx$



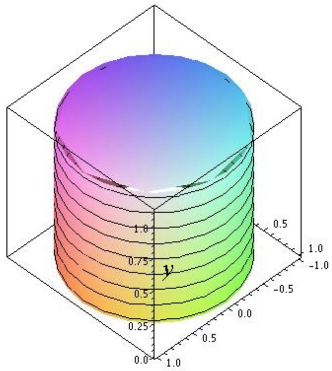
6. $\int_0^1 \int_{-1}^1 \int_0^{\sqrt{1-z^2}} f(x,y,z)\,dz\,dx\,dy$



7. $\int_0^1 \int_{-\sqrt{1-z^2}}^{\sqrt{1-z^2}} \int_0^{\sqrt{1-x^2-z^2}} f(x,y,z)\,dy\,dx\,dz$



9. $\int_0^1 \int_{-1}^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x,y,z)\,dz\,dx\,dy$



1.0
0.75
0.5
0.25
0.0
y
0.5
1.0
-1.0
-0.5
0.0
0.5
1.0