

## Math 114 HW 6

due Monday, 6/13

1. (Spring 2011) Find the maximum value of the function  $f(x, y, z) = xy + yz$  on the surface of the sphere  $x^2 + y^2 + z^2 = 4$ .
2. (Spring 2010) Find the maximum of the function  $f(x, y) = 2x + 3y - 2z$  in the region  $4x^2 + 6y^2 + 2z^2 \leq 18$ .
3. (Fall 2010) Find the minimum of  $f(x, y, z) = xy + 2xz + 3yz$  subject to the constraint  $xyz = 6$ ,  $x \geq 0$ ,  $y \geq 0$ ,  $z \geq 0$ .
4. (Fall 2011) Find the product of the maximal and minimal values of the function

$$f(x, y) = x - 2y + 2xy$$

in the region

$$(x - 1)^2 + \left(y + \frac{1}{2}\right)^2 \leq 2.$$

5. (Spring 2009) Evaluate the integral  $\iint_R (x + y) dA$  where  $R$  is the region inside the triangle with vertices  $(x, y) = (0, 0)$ ,  $(2, 0)$  and  $(0, 1)$ .
6. (Fall 2011) Compute the double integral  $\int_0^1 \int_{ey}^e \frac{e - x}{\ln(x)} dx dy$
7. (Fall 2010) Evaluate  $I = \int_0^4 \int_{\sqrt{x}}^2 \sin(y^3) dy dx$ .
8. (Spring 2010) Calculate the following integral

$$\int_2^4 \int_{\frac{y-2}{2}}^1 e^{(x^2)} dx dy.$$

(You may need to change the order of integration.)

9. (Fall 2009) Evaluate

$$\int_0^1 \int_{\sqrt{y}}^1 \frac{ye^{x^2}}{x^3} dx dy.$$

10. (Spring 2011) Calculate  $\int_0^2 \int_{x^2}^4 \frac{e^{\sqrt{y}}}{y} dy dx$ .