Homework Section 14.7

1. Find the local maximum and minimum values and saddle point(s) of the function.

   a) $f(x,y)=x^4+y^4-4xy+1$ 　　　b) $f(x,y)=e^{4x-x^2-y^2}$

   c) $f(x,y)=2y^3+x^2y+x^2+5y^2$ 　　　d) $f(x,y)=y\sin x$

   e) $f(x,y)=x^2+y^2+\dfrac{2}{xy}$

2. Locate the absolute extrema of function *f* on the set *R*.

   a) $f(x,y)=1+3x-5y$, *R* is the closed plane region bordered by the triangle with vertices (0,0), (3,0), and (0,2).

   b) $f(x,y)=x^2+y^2+xy^2+6$, $R=\{(x,y)\,|\,-1\le x\le 1,\ -1\le y\le 1\}$

   c) $f(x,y)=x^4+y^4-4xy+3$, $R=\{(x,y)\,|\,0\le x\le 3,\ 0\le y\le 2\}$

   d) $f(x,y)=x^2y$, $R=\{(x,y)\,|\,x\ge 0,\ y\ge 0,\ x^2+y^2\le 4\}$

3. Locate the point on the plane $x+y-z=4$ that is closest to the point (2,1,3).

4. Locate the points on the surface $y^2=xz+2$ that are closest to the origin.

5. To hold all your math awards, you need a cardboard box with volume of 28,000 cubic centimeters and no lid. But cardboard is expensive, and you're not made of money, so you decide to use as little cardboard as possible. What are the dimensions of the box that minimizes the amount of cardboard used?