Exam II Hints and Answers
Math 126 E Spring 2011 – Version Alpha

1. (a) $f_x(x,y) = \dfrac{-y^4}{2x^{3/2}} \cos\left(\dfrac{y^4}{\sqrt{x}}\right)$

   (b) $f_y(x,y) = \dfrac{4y^3}{\sqrt{x}} \cos\left(\dfrac{y^4}{\sqrt{x}}\right)$

   (c) $f_{yy}(x,y) = \dfrac{12y^2}{\sqrt{x}} \cos\left(\dfrac{y^4}{\sqrt{x}}\right) - \dfrac{16y^6}{x} \sin\left(\dfrac{y^4}{\sqrt{x}}\right)$

2. $\displaystyle\int_0^1 \int_0^{y^2} g(x,y)\,dx\,dy + \int_1^5 \int_0^{\frac{1}{4}(5-y)} g(x,y)\,dx\,dy$

3. HINT: Let $f(x,y) = \dfrac{x^2}{y^3+1}$ and find the equation of the tangent plane at $(4,1)$.

   ANSWER: $f(4.01, 0.99) \approx 8.16$

4. There is a local minimum at $(0,0)$ and a saddle point at $\left(-\frac{1}{2}, 0\right)$.

5. $\left(0, \frac{6}{\pi}\right)$