

MATH 223  
Hints and Answers

Assignment 9

51. Use budget constraint to solve for  $x$  in terms of  $y$  to express Sydney's utility as  $s(y)$ .  
Then maximize that function using standard techniques from single variable calculus.  
It will probably be easier to work with the square of  $s(y)$ ; the algebra will be simpler.  
If Sydney has  $D$  dollars to spend, she should spend  $\frac{5}{7}D$  on apples.
- 52a. Expressions like  $\frac{x}{2}(xy)^{-1/2}$  and  $3x^{1/2}y^{-4/5}$  may occur.
31. Start with  $f_{xy} = f_{yx}$  and differentiate both sides with respect to  $x$ . Then let  $g = f_x$  and apply Clairaut's Theorem to  $g$ .
33. For first order and second order partial derivatives at  $(0,0)$ , you will need to use the definition of partial derivatives. For points  $(x,y)$  away from the origin, you can use straight forward differentiation rules on the formulas.