

## Calc 3 Homework 13

① Is the following function continuous:

$$f(x,y) = \begin{cases} \frac{5x^2y}{x^2+y^2} & \text{if } (x,y) \neq (0,0) \\ 0 & \text{if } (x,y) = (0,0) \end{cases}$$

② Find all 1<sup>st</sup>-order partial derivatives of:

a)  $f(x,y) = x^4y^3 + 8x^2y$

b)  $f(x,y) = \frac{x-y}{x+y}$

c)  $f(x,y,z) = x \sin(y-z)$

d)  $f(x,y,z) = xy z^2 \tan(z)$

③ Find all 2<sup>nd</sup>-order partial derivatives of:

a)  $f(x,y) = x^3y^5 + 2x^4y$

b)  $f(x,y) = x e^{xy}$

c) Verify that  $f_{xy} = f_{yx}$  in the above examples.