The Dogram	Quiz # 5 Math 102- 002 Calculus 1 July 2016, Friday Instructor: Ali Sinan Sertöz	
	Solution Key	
Bilkent University		
	Your Name:	•••••
Student ID:	Your Department:	••••

Q-1) Let $f(x, y, z) = xy^2z^3 + \sec(x^2 + xy + y^3) + \arcsin(\sqrt{x^2 + y^2}) + 2016$. Assuming that partial derivatives of all orders of f exist and are continuous, calculate $f_{xyyzzz}(27, 13, 201)$.

Show your work in detail. Correct answers without justification are never graded.

Answer:

First by the continuity of partials we know that we can change the order of differentiation without changing the result. In particular we know that

$$f_{xyyzzz} = f_{zzzyyx}.$$

We now calculate this partial derivative.

$$f_z = 3xy^2 z^2$$

$$f_{zz} = 6xy^2 z$$

$$f_{zzz} = 6xy^2$$

$$f_{zzzy} = 12xy$$

$$f_{zzzyy} = 12x$$

$$f_{zzzyyx} = 12.$$

Hence $f_{xyyzzz}(27, 13, 201) = f_{zzzyyx}(27, 13, 201) = 12$.