Quiz 2 – MA 225 B2 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	March 9, 2011

Name: ______________________________

BU ID: ______________________________

Score:	1.	__________	(out of 20)
	2.	__________	(out of 20)
	3.	__________	(out of 45)
	4.	__________	(out of 15)
Total:		__________	(out of 100)

Instructions: Please write clearly and show all work. No credit will be given if answers are not justified. If the problem asks you to use a specific method in your solution, please make sure you do so. No credit will be given if another method is used. The point value of each problem is written in bold at the beginning of each problem.

Question 1 [20 points] Determine whether or not the following limit exists. If it exists, what is its value? (Make sure you justify your answer.)

$$\lim_{(x,y)\to(0,0)} \frac{5x^3y}{x^4+3y^4}$$

Question 2. [20 points] Suppose that

$$g(x,y) = x^2\cos(x+y), \qquad x = \frac{3}{t}, \qquad y = te^t.$$

Find $\frac{dg}{dt}$ when $t = 3$.

Question 3. [**45 points**] Consider the function

$$f(x,y) = 2xy + x^2.$$

(i) Find the directional derivative of f in the direction of the vector $\langle 1, -2 \rangle$.

(ii) Find the equation of the tangent plane to the surface defined by the equation $z = f(x,y)$ at the point $(1,1,3)$.

(iii) Find the critical points of f and determine whether they are local maxima, minima, or saddles.

Question 4 [15 points] The dimensions of a rectangle are 10cm and 20cm, with an error in measurement of at most 3cm. Use differentials to calculate the maximum error in computing the area of the rectangle.

Quiz 2 – MA 225 B3 – Spring 2011

Instructor: Margaret Beck
TF: Man-Ho Ho
Date: March 9, 2011

Name: ______________________________

BU ID: ______________________________

Score:	1.	____________	(out of 20)
	2.	____________	(out of 20)
	3.	____________	(out of 45)
	4.	____________	(out of 15)
Total:		____________	(out of 100)

Instructions: Please write clearly and show all work. No credit will be given if answers are not justified. If the problem asks you to use a specific method in your solution, please make sure you do so. No credit will be given if another method is used. The point value of each problem is written in bold at the beginning of each problem.

Question 1 [20 points] Determine whether or not the following limit exists. If it exists, what is its value? (Make sure you justify your answer.)

$$\lim_{(x,y)\to(0,0)} \frac{3xy^3}{2x^4 + y^4}$$

Question 2. [20 points] Suppose that

$$g(x, y) = y^2 \sin(x + y), \qquad x = \frac{2}{t}, \qquad y = te^t.$$

Find $\frac{dg}{dt}$ when $t = 2$.

Question 3. [45 points] Consider the function

$$f(x, y) = 2xy + y^2.$$

(i) Find the directional derivative of f in the direction of the vector $\langle 1, -2 \rangle$.

(ii) Find the equation of the tangent plane to the surface defined by the equation $z = f(x, y)$ at the point $(1, 1, 3)$.

(iii) Find the critical points of f and determine whether they are local maxima, minima, or saddles.

Question 4 [15 points] The dimensions of a rectangle are 5cm and 10cm, with an error in measurement of at most 2cm. Use differentials to calculate the maximum error in computing the area of the rectangle.

Quiz 2 – MA 225 B4 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	March 10, 2011

Name: ______________________________

BU ID: ______________________________

Score:	1.	____________	(out of 20)
	2.	____________	(out of 20)
	3.	____________	(out of 45)
	4.	____________	(out of 15)
Total:		____________	(out of 100)

Instructions: Please write clearly and show all work. No credit will be given if answers are not justified. If the problem asks you to use a specific method in your solution, please make sure you do so. No credit will be given if another method is used. The point value of each problem is written in bold at the beginning of each problem.

Question 1 [20 points] Determine whether or not the following limit exists. If it exists, what is its value? (Make sure you justify your answer.)

$$\lim_{(x,y)\to(0,0)} \frac{2x^2y^2}{x^4+5y^6}$$

Question 2. [20 points] Suppose that

$$g(x,y) = x^2e^{x+y}, \qquad x = \cos t, \qquad y = \frac{2}{t}.$$

Find $\frac{dg}{dt}$ when $t = 2$.

Question 3. [**45 points**] Consider the function

$$f(x, y) = x^2 + yx + y^2.$$

(i) Find the directional derivative of f in the direction of the vector $\langle 3, -1 \rangle$.

(ii) Find the equation of the tangent plane to the surface defined by the equation $z = f(x, y)$ at the point $(1, 1, 3)$.

(iii) Find the critical points of f and determine whether they are local maxima, minima, or saddles.

Question 4 [15 points] A cylindrical can has radius 10cm and height 20cm, with an error in measurement of at most 2cm. Use differentials to calculate the maximum error in computing the volume of the can.

Quiz 2 – MA 225 B5 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	March 10, 2011

Name: ______________________________

BU ID: ______________________________

Score:	1.	____________	(out of 20)
	2.	____________	(out of 20)
	3.	____________	(out of 45)
	4.	____________	(out of 15)
Total:		____________	(out of 100)

Instructions: Please write clearly and show all work. No credit will be given if answers are not justified. If the problem asks you to use a specific method in your solution, please make sure you do so. No credit will be given if another method is used. The point value of each problem is written in bold at the beginning of each problem.

Question 1 [20 points] Determine whether or not the following limit exists. If it exists, what is its value? (Make sure you justify your answer.)

$$\lim_{(x,y)\to(0,0)} \frac{3x^2y^2}{4x^4+y^6}$$

Question 2. [20 points] Suppose that

$$g(x,y) = y^2e^{x+y}, \qquad x = \cos t, \qquad y = \frac{4}{t}.$$

Find $\frac{dg}{dt}$ when $t = 4$.

Question 3. [45 points] Consider the function

$$f(x, y) = x^2 + 3yx + y^2.$$

(i) Find the directional derivative of f in the direction of the vector $\langle 2, -3 \rangle$.

(ii) Find the equation of the tangent plane to the surface defined by the equation $z = f(x, y)$ at the point $(1, 1, 5)$.

(iii) Find the critical points of f and determine whether they are local maxima, minima, or saddles.

Question 4 [15 points] A cylindrical can has radius 5cm and height 10cm, with an error in measurement of at most 3cm. Use differentials to calculate the maximum error in computing the volume of the can.