

King Fahd University of Petroleum and Minerals
Department of Math & Stat
Math 201, Sections 1, 5, 8, 20 (081)
Quiz 3(a)

Time: 20 minutes

Marks: _____/9

Name: _____ Section #: _____

ID #: _____ Serial #: _____

1. Let

$$L_1 : x = 1 + 7t, y = 3 + t, z = 5 - 3t$$

$$L_2 : x = 4 - t, y = 6, z = 7 + 2t$$

(a) Check whether the lines L_1 and L_2 are parallel or skew lines. [3]

(b) Find distance between the lines L_1 and L_2 . [3]

2. If (x, y) changes from $(3, -1)$ to $(2.96, -0.95)$ in the function $z = x^2 - xy + 3y^2$, then the value of the differential dz is

- (a) 1
- (b) $\sqrt{2}$
- (c) -0.73
- (d) $\frac{2}{5}$
- (e) -12

[3]

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Quiz 3(b)

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1. Identify the surfaces and make a rough sketch:

(a) $x^2 + 4y + 9z^2 = 0$. [3]

(b) $x^2 - y^2 + z^2 - 4x - 2y - 2z + 4 = 0$. [3]

2. The linearization $L(x, y)$ of the function $f(x, y) = x^2y + \sqrt{x^2 + y^2}$ at the point $(1, 0)$ is

(a) $y - x^2$

(b) $2x - y + 1$

(c) $y + x^2 + 1$

(d) $x + y$

(e) $8y^2 - x + 3$

[3]

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1. Sketch the surfaces

$$S_1 : z = x^2 + y^2$$

$$S_2 : z = 6 - x^2 - y^2$$

Also describe and sketch curve of intersection between S_1 and S_2 .

[6 = 1 + 1 + 4]

2. The function $f(x, y, z) = \frac{xyz}{x^3 + y^3 + z^3}$ is differentiable on
- (a) plane $2x - y + 4z = 38$
 - (b) its entire domain
 - (c) $[0, 1] \times [-1, 1]$
 - (d) solid sphere $x^2 + y^2 + z^2 \leq 1$
 - (e) circular cone $x^2 - y^2 + z^2 = 0$

[3]

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1. Identify the surface and make a rough sketch:

$$z = (x + 2)^2 + (y - 5)^2 - 3.$$

[3]

2. Find the distance between planes $x + 2y - 2z = 3$ and $2x + 4y - 4z = 7$. [3]

3. The tangent plane approximation of $f(x, y) = \tan^{-1}(x + 2y)$ at $(1, 0)$ is

(a) $\frac{x}{2} + y + \frac{\pi}{4} - \frac{1}{2}$

(b) $x^2 + y$

(c) $2x - y + 1$

(d) $x + y^2 - 2$

(e) $3 - 2y$

[3]