Quiz 1 – MA 225 B2 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	February 2, 2011

Name: _____

BU ID: _____

Score: 1. _____ (out of 24)

2. _____ (out of 14)

3. _____ (out of 42)

4. _____ (out of 20)

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 [24 points] Consider the vectors

$$\mathbf{a} = \langle 2, 1, 0 \rangle \qquad \mathbf{b} = -\mathbf{i} + 3\mathbf{j} + \mathbf{k}.$$

Compute the following quantities:

$$(i)\ \mathbf{a} + 7\mathbf{b} \qquad (ii)\ \mathbf{a} \cdot \mathbf{b} \qquad (iii)\ \mathbf{a} \times \mathbf{b}$$

Finally,

(iv) Are the vectors $\mathbf{a}$ and $\mathbf{b}$ orthogonal, parallel, both or neither? Please justify your answer.

Question 2. [14 points] Find all the unit vectors that are orthogonal to both $\mathbf{i} - 3\mathbf{j}$ and $-2\mathbf{j} + \mathbf{k}$.

Question 3. [42 points] Consider the two planes defined by

$$3x + y - z = 4, \qquad -2x + y + z = 1.$$

(i) Find the angle between the planes.

(ii) Find the parametric equations of the line that lies in the intersection of the planes.

(iii) Find a scalar equation of the plane containing the point $P(1, 0, -1)$ that is perpendicular to the two given planes.

Question 4 [20 points] Use traces to sketch the graph of the function defined by

$$x^2 - \frac{y^2}{4} + \frac{z^2}{9} = 1.$$

(You do not necessarily need to use traces in each variable, but make sure you use enough to justify your picture. If you feel you are having trouble drawing it, just do the best you can and explain it words what it should look like.)

Quiz 1 – MA 225 B3 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	February 2, 2011

Name: _____

BU ID: _____

Score:	1.	_____ (out of 24)
	2.	_____ (out of 14)
	3.	_____ (out of 42)
	4.	_____ (out of 20)
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 [24 points] Consider the vectors

$$\mathbf{a} = \langle 2, 1, 0 \rangle \qquad \mathbf{b} = -\mathbf{i} + 4\mathbf{j} + \mathbf{k}.$$

Compute the following quantities:

$$(i)\ \mathbf{a} + 7\mathbf{b} \qquad (ii)\ \mathbf{a} \cdot \mathbf{b} \qquad (iii)\ \mathbf{a} \times \mathbf{b}$$

Finally,

(iv) Are the vectors $\mathbf{a}$ and $\mathbf{b}$ orthogonal, parallel, both or neither? Please justify your answer.

Question 2. [14 points] Find all the unit vectors that are orthogonal to both $\mathbf{i} - 3\mathbf{j}$ and $-2\mathbf{j} + \mathbf{k}$.

Question 3. [42 points] Consider the two planes defined by

$$3x + y - z = 4, \qquad -2x + y + z = 1.$$

(i) Find the angle between the planes.

(ii) Find the parametric equations of the line that lies in the intersection of the planes.

(iii) Find a scalar equation of the plane containing the point $P(1, 0, -1)$ that is perpendicular to the two given planes.

Question 4 [20 points] Use traces to sketch the graph of the function defined by

$$x^2 - \frac{y^2}{4} + \frac{z^2}{9} = 1.$$

(You do not necessarily need to use traces in each variable, but make sure you use enough to justify your picture. If you feel you are having trouble drawing it, just do the best you can and explain it words what it should look like.)

Quiz 1 – MA 225 B4 – Spring 2011

Instructor: Margaret Beck
TF: Man-Ho Ho
Date: February 3, 2011

Name: _____

BU ID: _____

Score: 1. _____ (out of 24)
2. _____ (out of 14)
3. _____ (out of 42)
4. _____ (out of 20)
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 [24 points] Consider the vectors

$$\mathbf{a} = \langle 1, 3, 0 \rangle \qquad \mathbf{b} = 2\mathbf{i} - \mathbf{j} + \mathbf{k}.$$

Compute the following quantities:

$$(i)\ \mathbf{a} + 7\mathbf{b} \qquad (ii)\ \mathbf{a} \cdot \mathbf{b} \qquad (iii)\ \mathbf{a} \times \mathbf{b}$$

Finally,

(iv) Are the vectors $\mathbf{a}$ and $\mathbf{b}$ orthogonal, parallel, both or neither? Please justify your answer.

Question 2. [14 points] Find all the unit vectors that are orthogonal to both $2\mathbf{i} + \mathbf{j}$ and $3\mathbf{j} + \mathbf{k}$.

Question 3. [42 points] Consider the two planes defined by

$$x + 3y - z = 4, \qquad x - 2y + z = 1.$$

(i) Find the angle between the planes.

(ii) Find the vector equation of the line that lies in the intersection of the planes.

(iii) Find a scalar equation of the plane containing the point $P(2, 1, -1)$ and the line of intersection of the given planes.

Question 4 [20 points] Use traces to sketch the graph of the function defined by

$$\frac{x^2}{9} - \frac{y^2}{4} - z = 0.$$

(You do not necessarily need to use traces in each variable, but make sure you use enough to justify your picture. If you feel you are having trouble drawing it, just do the best you can and explain it words what it should look like.)

Quiz 1 – MA 225 B5 – Spring 2011

Instructor:	Margaret Beck
TF:	Man-Ho Ho
Date:	February 3, 2011

Name: _____

BU ID: _____

Score:	1.	_____ (out of 24)
	2.	_____ (out of 14)
	3.	_____ (out of 42)
	4.	_____ (out of 20)
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 [24 points] Consider the vectors

$$\mathbf{a} = \langle 1, 3, 0 \rangle \qquad \mathbf{b} = 2\mathbf{i} - \mathbf{j} + 4\mathbf{k}.$$

Compute the following quantities:

$$(i)\ \mathbf{a} + 7\mathbf{b} \qquad (ii)\ \mathbf{a} \cdot \mathbf{b} \qquad (iii)\ \mathbf{a} \times \mathbf{b}$$

Finally,

(iv) Are the vectors $\mathbf{a}$ and $\mathbf{b}$ orthogonal, parallel, both or neither? Please justify your answer.

Question 2. [14 points] Find all the unit vectors that are orthogonal to both $-2\mathbf{i} + \mathbf{j}$ and $\mathbf{j} + \mathbf{k}$.

Question 3. [42 points] Consider the two planes defined by

$$x + 3y - 2z = 4, \qquad x - y + 2z = 1.$$

(i) Find the angle between the planes.

(ii) Find the vector equation of the line that lies in the intersection of the planes.

(iii) Find a scalar equation of the plane containing the point $P(1, 0, -2)$ and the line of intersection of the given planes.

Question 4 [20 points] Use traces to sketch the graph of the function defined by

$$\frac{x^2}{9} - \frac{y^2}{4} - z = 0.$$

(You do not necessarily need to use traces in each variable, but make sure you use enough to justify your picture. If you feel you are having trouble drawing it, just do the best you can and explain it words what it should look like.)