Math 212 Spring 2015

Quiz **1** MULTIVARIABLE CALCULUS

Name: _____ Assigned: **Friday January 23**

Due: **Monday January 26**

Time Begun: _____
Time Ended: _____ **Prof. Ron Buckmire**

Topic : Vectors and Lines in $\mathbb{R}^4$

The idea behind this quiz is to provide you with an opportunity to illustrate your ability to manipulate vectors algebraically and contemplate geometry in $\mathbb{R}^4$.

Reality Check:

EXPECTED SCORE : _____**/10** ACTUAL SCORE : _____**/10**

Instructions:

1. Once you open the quiz, you have **30 minutes** to complete, please record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one. QUIZZES WITH UNSTAPLED SHEETS WILL NOT BE GRADED.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Relax and enjoy...
7. **This quiz is due at the beginning of class on Monday January 26.**
   NO LATE OR UNSTAPLED QUIZZES WILL BE ACCEPTED FOR GRADING.

Pledge: I, _____, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Consider the position vectors $\vec{A} = (-1, 0, 2, 2)$ and $\vec{B} = (2, 2, 0, 1)$ for all of the problems below.

1. (*2 points*) Compute $\vec{A} - 3\vec{B}$.

2. (*2 points*) Find the coordinates of the midpoint between $\vec{A} = (-1, 0, 2, 2)$ and $\vec{B} = (2, 2, 0, 1)$.

3. (*2 points*) Compute the dot product of $\vec{A}$ and $\vec{B}$, i.e. $\vec{A} \cdot \vec{B}$. Explain the geometric significance of your answer.

4. (*2 points*) Write down the vector equation (i.e. $\vec{x}(t) = \vec{p} + \vec{dt}$) of the line joining the points represented by the position vectors $\vec{A}$ and $\vec{B}$.

5. (*2 points*) Write down the position vector of another point (OTHER than $\vec{A}$ or $\vec{B}$!) that you are certain is on the line defined in Question 4. Is the point represented by position vector $\vec{C} = (5, 4, -2, 0)$ also on the line joining $\vec{A}$ and $\vec{B}$? How do you know? **Explain your answer!**