Math 20C **Exam 1** **Name:** _____
Spring 2015 **Version A** **PID:** _____

Instructions

1. **Write your *Name*, *PID*, *Section*, and *Exam Version* on the front of your Blue Book.**
2. **No calculators or other electronic devices are allowed during this exam.**
3. **You may use one page of notes, but no books or other assistance during this exam.**
4. **Read each question carefully, and answer each question completely.**
5. **Write your solutions clearly in your Blue Book.**
   (a) **Carefully indicate the number and letter of each question and question part.**
   (b) **Present your answers in the same order as they appear in the exam.**
   (c) **Start each numbered problem on a new side of a page.**
6. **Show all of your work. No credit will be given for unsupported answers, even if correct.**
7. **Write Name & PID on this exam sheet and return inside front cover of your Blue Book.**

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0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (6 points) The two lines $\mathbf{r_1}(t) = \langle 1+t, 2-3t, 3-2t\rangle$ and $\mathbf{r_2}(t) = \langle 1+2t, 2+2t, 3-t\rangle$ intersect at a point. Find an equation for the plane that contains both of these lines.

2. (6 points) Consider the vectors $\mathbf{v} = \mathbf{i} + 2\mathbf{j} - 2\mathbf{k}$ and $\mathbf{w} = 2\mathbf{i} + 3\mathbf{j} - \mathbf{k}$.
   (a) Compute $\mathbf{v} \times \mathbf{w}$.
   (b) Determine the area of the parallelogram spanned by $\mathbf{v}$ and $\mathbf{w}$.
   (c) Find a unit vector that is orthogonal to both $\mathbf{v}$ and $\mathbf{v} \times \mathbf{w}$.

3. (6 points) Evaluate $\lim\limits_{(x,y)\to(0,0)} \dfrac{2x^2}{\sqrt{x^2+y^2}}$ or explain why it does not exit.

4. (6 points) Points $(0,0,0)$, $(3,6,-2)$, $(5,7,0)$, and $(2,1,2)$ are the vertices of a parallelogram.
   (a) Find the two angles of the parallelogram. (You may leave you answer in terms of arccosine.)
   (b) Verify that the given four points do indeed lie on the same plane.
   (That is, show that the points are coplanar.)

(This exam is worth 25 points.)