Math 255 - Winter 2013
Group Work 2
Friday, January 25

1. Let $\mathbf{r}_1(t) = \langle 1+t, 0, 0\rangle$ and $\mathbf{r}_2(t) = \langle 0, t, 0\rangle$.
   (a) Identify these familiar lines. Are they parallel, intersecting or skew?
   (b) Consider the following : "In an attempt to find the intersection of these lines, set $x_1 = x_2$, $y_1 = y_2$ and $z_1 = z_2$. So $1+t = 0$, $0 = t$ and $0 = 0$. This implies $t = -1$ and $t = 0$, which is impossible. So these lines can't intersect."
   What's wrong with this argument and how can you fix it?
   (c) If $\mathbf{r}_1(t)$ and $\mathbf{r}_2(t)$ describe the motion of two cars, should the passengers be worried?
2. Determine whether the following pairs of lines are parallel, intersecting or skew.
   If the lines are intersecting, find their point of intersection. If they are parallel or skew, find the distance between them.
   (a) $\mathbf{r}_3(t) = \langle 1+2t, 2t, 2+t\rangle$ and $\mathbf{r}_4(t) = \langle 2+2t, 3+2t, 2+t\rangle$
   (b) $\mathbf{r}_5(t) = \langle 1+t, 2t, 2+t\rangle$ and $\mathbf{r}_6(t) = \langle t, t, -1+3t\rangle$
3. (a) Given points P and Q, we can use the point P and the vector $\mathbf{v} = \overrightarrow{PQ}$ to write the parametric equations of the line PQ.
   What range of values for the parameter t would describe the line segment PQ?
   (b) 13.1 Example 5
4. Stewart 13.1.41
5. Stewart 13.1 21-26
6. Stewart 12.6.34. Also describe the surface (center/vertex or axis of symmetry).
7. Stewart 12.6.43