Math 20C – Swanson – Fall 2019
Homework 3
Due Monday, 10/21/19 at 11:59pm

- The graded part of the homework is on WebAssign.

- The problems below are also assigned and you are responsible for doing them, but they will not be collected or graded.

1. Two particles are traveling according to the following parametric equations for their position as a function of time:

$$\vec{r}_1(t) = \langle 7, 11, -9 \rangle + t\langle 2, 3, -1 \rangle \qquad \text{and} \qquad \vec{r}_2(t) = \langle 7, -11, -15 \rangle + t\langle -1, 4, 2 \rangle.$$

   (a) Determine if the lines on which the two particles are traveling intersect. If so, determine all points of intersection.

   (b) Determine if the particles collide. If so, determine the time of collision.

2. (a) Suppose that $\vec{a}$ and $\vec{b}$ are nonzero and parallel. Show that $\vec{a} \times \vec{b} = \vec{0}$.

   (b) Suppose that $\vec{a}$ and $\vec{b}$ are nonzero and $\vec{a} \times \vec{b} = \vec{0}$. Show that $\vec{a}$ and $\vec{b}$ are parallel.

   (c) If $\vec{a} = \vec{0}$ or $\vec{b} = \vec{0}$, what is $\vec{a} \times \vec{b}$?