WORKSHEET 2 - DUE 9/14

MATH 2110Q – Fall 2015
Professor Hohn

You must show all of your work to receive full credit!

1. Decide whether each of the following expressions make sense. If so, calculate the given expression. If not, explain why.

   Let $\vec{a} = \hat{x} + \hat{y} - 2\hat{z}$, $\vec{b} = 3\hat{x} - 2\hat{y} + \hat{z}$, and $\vec{c} = \hat{y} - 5\hat{z}$.

   (a) $\vec{a} \cdot \vec{b}$

   (b) $\left\| \vec{b} \times \vec{c} \right\|$

(c) $\vec{a} \cdot (\vec{b} \cdot \vec{c})$

(d) $\vec{a} \times (\vec{b} \times \vec{c})$

2. Find the values of x such that the vectors $\langle 3, 2, x \rangle$ and $\langle 2x, 4, x \rangle$ are orthogonal.

3. Let $\vec{a} = \langle 1, 1, -1 \rangle$ and $\vec{b} = \langle 2, 4, 6 \rangle$

   (a) Compute $\vec{c} = \vec{a} \times \vec{b}$.

   (b) Show that $\vec{c}$ is orthogonal to $\vec{a}$.

   (c) Show that $\vec{c}$ is orthogonal to $\vec{b}$.

4. Let $\vec{a}, \vec{b} \in V_3$. Show that
$$\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}.$$

Hint: Start by letting $\vec{a} = \langle a_1, a_2, a_3 \rangle$ and $\vec{b} = \langle b_1, b_2, b_3 \rangle$. Show that the right hand side of the equation and the left hand side are the same.