Linear Algebra, Spring 2016
Quiz 8

Name: SOLUTIONS

You must show all your work to receive credit. Calculators are allowed.

Problem 1: (3 points) Let $\vec{v_1}, \vec{v_2}, \vec{v_3}$ be vectors in $\mathbb{R}^3$ such that $\text{Det}\begin{bmatrix}\vec{v_1} & \vec{v_2} & \vec{v_3}\end{bmatrix} = -5$. Find

$$\text{Det}\begin{bmatrix}13\vec{v_1}+3\vec{v_3} & 2\vec{v_2} & 7\vec{v_1}-11\vec{v_2}\end{bmatrix}.$$

$$\left|13\vec{v_1}+3\vec{v_3} \quad 2\vec{v_2} \quad 7\vec{v_1}-11\vec{v_2}\right| = 13\left|\vec{v_1} \quad 2\vec{v_2} \quad 7\vec{v_1}-11\vec{v_2}\right|$$

$$+ 3\left|\vec{v_3} \quad 2\vec{v_2} \quad 7\vec{v_1}-11\vec{v_2}\right| = 13\left[7\left|\vec{v_1} \quad 2\vec{v_2} \quad \vec{v_1}\right| - 11\left|\vec{v_1} \quad 2\vec{v_2} \quad \vec{v_2}\right|\right]$$

$$+ 3\left[7\left|\vec{v_3} \quad 2\vec{v_2} \quad \vec{v_1}\right| - 11\left|\vec{v_3} \quad 2\vec{v_2} \quad \vec{v_2}\right|\right]$$

$$= 13\left[0 - 0\right] + 3\left[14\left|\vec{v_3} \quad \vec{v_2} \quad \vec{v_1}\right| - 0\right]$$

$$= 42\left|\vec{v_3} \quad \vec{v_2} \quad \vec{v_1}\right| = -42\left|\vec{v_1} \quad \vec{v_2} \quad \vec{v_3}\right| = -42 \cdot -5$$

$$= 210$$