MAT 175 HOMEWORK #3

DUE MARCH 1 (WEDNESDAY)

Note: *Please* **staple** *if necessary. Numbering of problems is as in the textbook.*

(11.3.**8**) Let $\vec{a} = \langle\sqrt{3}/3, \sqrt{3}/3, \sqrt{3}/3\rangle$, $\vec{b} = \langle 1, -1, 0\rangle$, and $\vec{c} = \langle -2, -2, 1\rangle$. Find the angle between each pair of vectors.

(11.3.**20**) For what numbers c are the vectors $\vec{u} = 2c\vec{i} - 8\vec{j}$ and $\vec{v} = 3\vec{i} + c\vec{j}$ orthogonal?

(11.3.**30**) Let $\vec{u} = 3\vec{i} + 2\vec{j} + \vec{k}$ and $\vec{v} = 2\vec{i} - \vec{k}$. Find $\text{proj}_{\vec{u}}\vec{v}$.

(11.3.**44**) Which of the following do not make sense?

(a) $\vec{u} \cdot (\vec{v} + \vec{w})$
(b) $(\vec{u} \cdot \vec{w})\|\vec{w}\|$
(c) $\|\vec{u}\| \cdot (\vec{v} + \vec{w})$
(d) $(\vec{u} + \vec{v})\vec{w}$

(11.3.**70**) Find the equation of the plane through $(-1, 2, -3)$ and parallel to the plane $2x + 4y - z = 6$.

(11.4.**2**) Let $\vec{a} = \langle 3, 3, 1\rangle$, $\vec{b} = \langle -2, -1, 0\rangle$, and $\vec{c} = \langle -2, -3, -1\rangle$. Find each of the following:

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

(11.4.**10**) Find the area of the triangle with vertices $(1, 2, 3)$, $(3, 1, 5)$, and $(4, 5, 6)$.

(11.4.**12**) Find the equation of the plane through the points $(1, 1, 2)$, $(0, 0, 1)$, and $(-2, -3, 0)$.

(11.4.**16**) Find the equation of the plane through $(0, 0, 2)$ that is parallel to the plane $x + y + z = 1$.

(11.4.**20**) Find the equation of the plane though the origin that is perpendicular to the xy-plane and the plane $3x - 2y + z = 4$.