Math 2551 Worksheet Section 12.4

1. Let $\vec{u} = 2\hat{i} - 2\hat{j} - \hat{k}$ and $\vec{v} = \hat{i} - \hat{k}$. Compute the following:
   (a) $\vec{u} \times \vec{v}$.
   (b) $3\vec{u} \times 2\vec{v}$.
   (c) $\vec{v} \times \vec{u}$.
2. Let $P = (1, -1, 2)$, $Q = (2, 0, -1)$, and $R = (0, 2, 1)$.
   (a) Find the area of the triangle determined by the points P, Q, and R.
   (b) Find a unit vector normal to the plane containing P, Q, and R.
3. Find the volume of the parallelepiped, where four of whose vertices are $A(0, 0, 0)$, $B(1, 2, 0)$, $C(0, -3, 2)$, $D(3, -4, 5)$ such that vertex D does not lie in the same plane as A, B, and C.