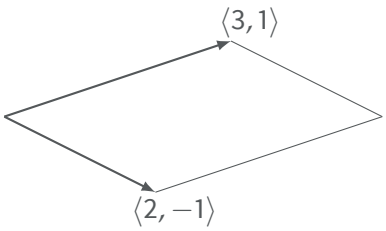
Math 143 Set 13

1. Find the area of this parallelogram:



2. Simplify $|\mathbf{u} \times \mathbf{v}|^2 + (\mathbf{u} \cdot \mathbf{v})^2$ for vectors $\mathbf{u}, \mathbf{v}$ in $\mathbb{R}^3$. (Hint: use the angle between them, θ.)

3. Find the parametric equations for the lines described below:

a. The line passing through the point $(2, 3, -1)$ and parallel to $\langle 1, 0, 1 \rangle$.

b. The line passing through the point $(0, 3, -1)$ and perpendicular to both $\langle 2, 2, 1 \rangle$ and $\langle 1, -2, 1 \rangle$.

c. The line passing through the points $(0, 1, -1)$ and $(2, 2, 2)$.

d. The line containing $(2, 1, 1)$ and perpendicular to both $\langle 1, 1, 0 \rangle$ and $\langle 0, 1, 2 \rangle$.