The cross product

The area of a parallelogram

- The area of a parallelogram with adjacent edges formed by the vectors $\mathbf{u}$ and $\mathbf{v}$ is given by
  
  $$A = ||\mathbf{u} \times \mathbf{v}||$$

**Example:** Use $||\mathbf{u} \times \mathbf{v}||$ to compute the area of a parallelogram with adjacent edges bounded by $\mathbf{u} = \langle 1, 1, 2 \rangle$ and $\mathbf{v} = \langle -5, 4, 3 \rangle$. 
Example: Compute the area of a parallelogram with vertices $A = (5, 2, 0), B = (2, 6, 1), C = (2, 4, 7), D = (5, 0, 6)$.

- The area of a triangle with adjacent edges formed by the vectors $\mathbf{u}$ and $\mathbf{v}$ is given by

\[ A = \frac{||\mathbf{u} \times \mathbf{v}||}{2} \]

Example: Compute the area of a triangle with vertices $A = (1, 1, 1), B = (-1, 4, 7), C = (0, -2, 2)$. 