In this worksheet you will study the dot and cross products.

1. Consider the regular hexagon.
   (a) Compute the magnitudes $|\mathbf{u}|$, $|\mathbf{v}|$ and $|\mathbf{w}|$.
   
   (b) What is the angle $\theta$?

   (c) Compute $\mathbf{u} \cdot \mathbf{v}$.

   (d) Compute $\mathbf{u} \cdot \mathbf{w}$.

   (e) What are $\text{proj}_\mathbf{u} \mathbf{w}$ and $\text{proj}_\mathbf{w} \mathbf{v}$?

   (f) What is the $x$-component of $\mathbf{u} + \mathbf{v} + \mathbf{w}$?
2. Consider the triangle with vertices \( P(1, 1, 3), Q(2, 3, 1) \) and \( R(-1, 2, -2) \).

   (a) Compute the cosines of the three internal angles of the triangle.

   (b) Find a vector orthogonal to the plane containing the triangle.

   (c) Compute the area of the triangle.