1. [12.2.54] Vectors are drawn from the center of a regular $n$-sided polygon in the plane to the vertices of the polygon. Show that the sum of the vectors is zero. (Hint: What happens to the sum if you rotate the polygon about its center?)
2. [12.Adv.15] The projection of a vector on a plane Let $P$ be a plane in space and let $\vec{v}$ be a vector. The vector projection of $\vec{v}$ onto the plane $P$, $\text{proj}_P \vec{v}$, can be defined informally as follows. Suppose the sun is shining so that its rays are normal to the plane $P$. Then $\text{proj}_P \vec{v}$ is the “shadow” of $\vec{v}$ onto $P$. If $P$ is the plane $x + 2y + 6z = 6$ and $\vec{v} = \vec{i} + \vec{j} + \vec{k}$, find $\text{proj}_P \vec{v}$. 
3. [13.2.44] **Height versus time** Show that a projectile attains three-quarters of its maximum height in half the time it takes to reach the maximum height.