

Department of Mathematics and Statistics
Arizona State University

Project 1 for honor students due on or before Wednesday January 23, 2008
Dr. Firoz

Your name:

1. Prove that scalar projection of \vec{b} onto \vec{a} is $comp_a b = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}|}$ and

2. Vector projection of \vec{b} onto \vec{a} is $proj_a b = \left(\frac{\vec{a} \cdot \vec{b}}{|\vec{a}|} \right) \frac{\vec{a}}{|\vec{a}|}$

3. For a given point $P(a, b, c)$ in 3D show that

$$\cos \alpha = \frac{a}{\sqrt{a^2 + b^2 + c^2}}, \cos \beta = \frac{b}{\sqrt{a^2 + b^2 + c^2}}, \cos \gamma = \frac{c}{\sqrt{a^2 + b^2 + c^2}}, \text{ where}$$
$$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$$