Math 172 Written Assignment 12 Name: _____

ID#: _____ Lab Section#: _____

1. Given the points $P(-1,5,7)$, $Q(2,1,4)$, $R(1,1,1)$ and the vectors $\vec{\mathbf{v}} = \overrightarrow{PQ}$ and $\vec{\mathbf{w}} = \overrightarrow{PR}$, find:

a) $3\vec{\mathbf{v}} - 2\vec{\mathbf{w}}$

b) $||\vec{\mathbf{v}}||$

c) the angle θ between $\vec{\mathbf{v}}$ and $\vec{\mathbf{w}}$. Give answer exactly (using $\cos^{-1}$), and to the nearest 0.1 degree

d) $\text{proj}_{\vec{\mathbf{v}}}\vec{\mathbf{w}}$

e) $\text{scal}_{\vec{\mathbf{w}}}\vec{\mathbf{v}}$

f) a unit vector that is orthogonal to both $\vec{\mathbf{v}}$ and $\vec{\mathbf{w}}$

1. (continued)

g) the area of triangle PQR

h) the equation (in x,y,z) of the sphere centered at P and containing R

i) a parametric vector equation of the line through Q and perpendicular to triangle PQR

2. In $\mathbb{R}^3$, graph the curve $\vec{\mathbf{r}}(t) = \langle \sin(\pi t),\ t/2,\ \cos(\pi t) \rangle$, $0 \leq t \leq 4$. Trying different points of view might help your sketch.