Pledge:

1/2/2010 MATH361 Calculus III Name:_____
Dr. Lunsford Quiz 2 (30 Points Total)

Please show all work on this quiz.

Problem I. Given the points $P(2,1,5)$, $Q(-1,3,4)$, and $R(3,0,6)$ please answer the following: (8 points total)

(a) Find a unit vector orthogonal (i.e. perpendicular) to the plane through the three points. (5 points)

(b) Find the area of the triangle ΔPQR. (3 points)

Problem II. Consider the plane given by the equation $2x-3y+4z=4$ and the line given by the parametric equations $x=3+3t$, $y=2-2t$, and $z=1-3t$. Please answer the following: (11 points total)

(a) Give a vector perpendicular to the plane. (2 points)

(b) Is the point $P(3,2,1)$ on the plane? Why or why not? (3 points)

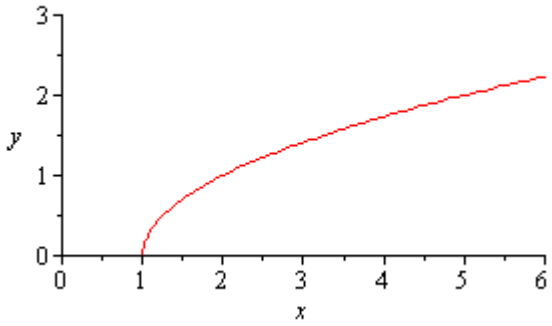
(c) Find a vector parallel to the line. (2 points)

(d) Does the line lie on the plane? Why or why not? (4 points)

Problem III. Consider a point that moves along the plane curve given by $\mathbf{r}(t) = (1+t)\,\mathbf{i} + \sqrt{t}\,\mathbf{j}$. To your right you are given a graph of this curve.
Please answer the following: (6 points total)

(a) Sketch the position vector $\mathbf{r}(1)$ on the graph. (2 points)

(b) Sketch the tangent (velocity) vector to the graph at $t = 4$. (4 points)



Problem IV. Consider the space curve given by $\mathbf{r}(t) = \cos(3t)\,\mathbf{i} + e^{3t}\,\mathbf{j} + 2\sin(2t)\,\mathbf{k}$. Find the unit tangent vector to the curve at $t = 0$. (5 points)