Math 2313, Test I

Name _____

1. a. Find the equations of the line perpendicular to the plane $2x - 4y - 3z = 11$ and through the point $(2, 1, 3)$.
    answer: $x = 2 + 2t, y = 1 - 4t, z = 3 - 3t$

    b. Find the equation of the plane perpendicular to the line $x = -1 + 2t, y = 3t, z = 2 - 4t$ and through the point $(2, 1, 3)$.
    answer: $2x + 3y - 4z + 5 = 0$

2. Find the angle between the vectors $< 4, -3, 2 >$ and $< 1, 5, -1 >$.
   answer: 117.7 degrees

3. Find the area of a triangle which has edges $u =< 1, -3, 1 >$ and $v =< 3, 5, -2 >$ and $u - v$.
   answer: 7.45

4. If $r(t) =< \cos(t) + t\ \sin(t), \sin(t) - t\ \cos(t), \frac{1}{2}t^2 >$,

    a. Find the arc length from $t = 0$ to $t = 4$.
       answer: $8\sqrt{2}$

    b. Find parametric equations for the tangent line to the curve at $t = 2\pi$.
       answer: $x = 1 + 2\pi t, y = -2\pi, z = 2\pi^2 + 2\pi t$

5. If $r''(t) =< 0, -10 >, r(0) =< 2, 1 >$ and $r'(0) =< 1, 2 >$ find $r(t)$.
   answer: $r(t) =< 2 + t, 1 + 2t - 5t^2 >$