Test Total

Name _____

Test 1 Calculus III 3450:223–003 Dr. Norfolk February 11, 2011

Show all of your work and explain your reasoning. Give exact answers where possible.

1. Consider the line which passes through $P(1, 2, -2)$ and $Q(3, 4, -5)$.

   (a) Write a parametric equation for this line.

5 points

   (b) Find where this line intersects the zx-plane.

5 points

   (c) Find the distance from the point of intersection with the zx-plane and the point P.

5 points

   (d) Find the angle between the line and the y-axis.

5 points

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2. Consider the lines

$$L_1 \ : \ \frac{x-1}{2} = \frac{y-1}{-1} = \frac{z-0}{3}$$

and

$$L_2 \ : \ \underline{r} = < 3, 2, c > + t < -1, 2, 1 >$$

(a) Find the value of c so that these lines intersect.

10 points

(b) Find the equation of the plane which contains both lines.

5 points

3. A ball is thrown from 8 ft above the ground at an angle of 45^o, and initial speed $32\sqrt{2}$ ft/s. There is a target 48 ft away on flat ground, of height 6 ft. Assume that $g = 32$ ft/s^2.

Will the ball hit the target?

10 points

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4. The position of a particle at time t is given by

   $\underline{r}(t) =< \sec(t-1)\tan(t-1), \ln(\ln(t+1)), \tan^{-1}(1/t) >$.

   Find the *equation* of the *tangent line* when $t = 1$.

15 points

5. The velocity of a particle at time t is given by $\underline{v}(t) =< t\sin(t^2), te^t, \dfrac{t}{1+t^4} >$, and the initial position is $\underline{r} = \underline{i} - 3\underline{j}$.

   Find the position function.

15 points

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