Math 208 - Fall 2006

Name _____

Test 1

Rules: There are 4 questions in this test and 3 pages. You can use your calculator. You cannot use your book or any notes. You have 50 minutes.
Good Luck.

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

   (a) What is the domain of $\mathbf{r}(t)$?

   (b) For which value of a isthe following vector-valued function continuous at $t = -2$?

$$\mathbf{s}(t) = \begin{cases} < a, -1, 4 > & \text{if } t = -2 \\ \mathbf{r}(t) & \text{if } t \neq 1. \end{cases}$$

   (c) Compute the value of $\mathbf{r}(t)$ at $t = 0$.

2. Describe the surface $x^2 + z^2 = y^2$. If a sketch is useful, you may sketch the surface but it is acceptable to just adequately describe it in words.

3. Let s and r be two lines which are defined by the following parametric equations

$$s: \begin{cases} x = t + 9 \\ y = 7t \\ z = 8t + 8 \end{cases} \quad \text{and} \quad r: \begin{cases} x = t + 8 \\ y = 0 \\ z = 2t + 6 \end{cases}$$

(a) Find the point in which the two lines intersect and decide whether they are perpendicular.

(b) Give the equation of the plane π containing the two lines.

(c) Find the distance between the plane π and the plane $14x + 6y - 7z = 0$.

4. Let $\mathbf{s}(t)$ be the vector-valued function given by $< \sin(3t), \cos(3t), e^t >$.

   (a) Sketch the graph of the curve traced out by the endpoints of $\mathbf{s}(t)$.

   (b) Find $\mathbf{s}'(t)$.

   (c) Are $\mathbf{s}(t)$ and $\mathbf{s}'(t)$ perpendicular for some value of t?