

AMAT 309 L02 Winter 2003

Quiz 1 30 Minutes

NAME: _____ ID: _____

1. A particle moves along the path $\mathbf{r} = \langle t^2, -t^2, 2 \rangle$. Find its velocity, speed, and acceleration for any value of t . Also describe the path of the particle. [25]

2. For each of the following answer True or False. [25]
 - (a) If an automobile drives along a highway at constant speed 105 km/hr, then its acceleration \mathbf{a} is zero. _____
 - (b) If an automobile drives along a circular track at constant speed 205 km/hr, then its acceleration \mathbf{a} is constant. _____
 - (c) If an automobile drives along a circular track at constant speed 205 km/hr then the magnitude a of its acceleration is constant. _____
 - (d) The curve $\mathbf{r} = \langle a \cos t \sin t, a \sin^2 t, a \cos t \rangle$ lies on a sphere. _____
 - (e) The set of all points (x, y, z) satisfying the two equations $a_1x + b_1y + c_1z = d_1$, $a_2x + b_2y + c_2z = d_2$ is a line. _____

3. A particle moves along the curve $y = x^3$, $z = x^2$ with constant vertical speed $dz/dt = 4$. Find both its velocity and acceleration at the point $P = (2, 8, 4)$. [Hint: A convenient parametrization can be found by taking $x = ct^{1/2}$ for the appropriate value of c .] [25]

4. Describe and sketch (roughly) the surface given by $x^2 - 4y - z^2 + y^2 + 12 - 6x = 0$. [25]