Math 126 Quiz #3 Name: _____

Directions: Please show all your work to receive full credit. Give brief explanations for word problems and end with a concluding sentence. Define any variables you introduce. Include units in answers when appropriate.

1. (25 points) You may answer these questions in any order you like.

The position of a particle at time t seconds is given by the function
$\mathbf{r}(t) = < t^2, 2t, \ln t >$, $1 \leq t \leq 3$.

a. Determine the speed of the particle at time $t = 1$ second.
b. Determine the distance traveled by the particle between $t = 1$ and $t = 3$.
c. Determine the rate (with respect to time) at which the direction of the particle is changing at $t = 1$.
d. Determine the curvature of the path at the point $(1, 2, 0)$.
e. Determine the normal component of the acceleration vector at time $t = 1$.

DO NOT WRITE ABOVE THIS LINE