

Math 173 - Quiz 5

March 4, 2010

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Find a set of parametric equations for the line tangent to the graph of $\vec{r}(t)$ at the given point.

$$\vec{r}(t) = t\hat{i} + t^2\hat{j} - 3t\hat{k}, \quad P(0, 0, 0)$$

2. (5 points) To open the 1992 Summer Olympics in Barcelona, bronze medalist archer Antonio Rebollo lit the Olympic torch with a flaming arrow. Suppose that Rebollo shot the arrow at a height of 6 ft above the ground 90 ft from a 70-ft-high cauldron, and he wanted the arrow to reach its maximum height exactly 4 ft above the center of the cauldron. Find the initial speed and firing angle of the arrow.

3. (3 points) Find the unit tangent vector for following vector-valued function.

$$\vec{r}(t) = (e^t \cos t)\hat{i} + (e^t \sin t)\hat{j} + 2\hat{k}$$