

Homework Assignment 2
Math 208
Fall 2006

1. Assume that a projectile is fired with a certain velocity from the ground. At what angle should be fired to get the maximal horizontal range (given the initial velocity)? Explain your answer.
2. Sketch the graph of the curve traced out by the endpoints of the two vector-valued functions:
 $\mathbf{r}(t) = \langle \cos(t), \sin(t), e^t \rangle$ and $\mathbf{s}(t) = \langle \cos(e^t), \sin(e^t), e^t \rangle$.
3. Let $\mathbf{r}(t)$ a vector-valued function.
 - (a) Compute the derivative of $\mathbf{r}(t) \cdot \mathbf{r}(t)$.
 - (b) Assume that $\|\mathbf{r}(t)\|$ is a constant, show that $\mathbf{r}(t)$ is perpendicular to $\mathbf{r}'(t)$ for all values of t . (*Hint*: write the square of the magnitude in terms of the dot product).
4. Find $\mathbf{r}'(t)$, $\int \mathbf{r}(t) dt$, the domain of $\mathbf{r}(t)$, $\lim_{t \rightarrow -\sqrt{3}} \mathbf{r}(t)$ and $\mathbf{r}(2)$ if $\mathbf{r}(t) = \langle te^{t^2}, \frac{t-\sqrt{3}}{t^2-3}, \sin(t) \rangle$
5. Page 936 number 61.