

MAC 2313

Quiz 4

February 18, 2010

1) A projectile is launched 15 feet above the ground at a speed of 88 feet per second and at an angle of 30° . Find the maximum height of the projectile, and find out the horizontal distance from its launch point to where it hits the ground.

2) Let $\mathbf{r}(t) = (t - \sin t)\mathbf{i} + (1 - \cos t)\mathbf{j}$.

a) Find \mathbf{T} , \mathbf{N} , $a_{\mathbf{T}}$ and $a_{\mathbf{N}}$. Your answers will be in terms of t .

b) In particular, work out the values of $\mathbf{T}(\pi)$, $\mathbf{N}(\pi)$, $a_{\mathbf{T}}(\pi)$, and $a_{\mathbf{N}}(\pi)$. What do the values of $a_{\mathbf{T}}(\pi)$, and $a_{\mathbf{N}}(\pi)$ mean?

c) Graph the curve $\mathbf{r}(t)$ for $0 \leq t \leq 4\pi$. At the point $\mathbf{r}(\pi) = \langle \pi, 2 \rangle$, plot the vectors $\mathbf{T}(\pi)$, $\mathbf{N}(\pi)$, and $\mathbf{a}(\pi)$.

3) Let $\mathbf{r}'(t) = e^t\mathbf{i} + \cos(t)\mathbf{j} - 3t^2\mathbf{k}$ and $\mathbf{r}(0) = \mathbf{j} + \mathbf{k}$. Find $\mathbf{r}(t)$.