Math 143 Set 17

1. Let k be any number. At what point does the graph of e^{kx} have maximum curvature?

2. Suppose that speed is constant. Why are velocity and acceleration perpendicular?

3. Show that if the curvature of a vector valued function is 0, then the function must be a line.

4. Show that the curvature of the graph of $y = f(x)$ is given by $\frac{|y''|}{(1+y'^2)^{3/2}}$.

5. Find the curvature of a circle of radius a.

6. Write the acceleration of $\mathbf{r}(t) = \langle t-1, t+1, t^2 \rangle$ as a combination of $\mathbf{T}$ and $\mathbf{N}$.

7. Find the curvature for the spiral described by the polar curve $r(\theta) = \theta$.