Math 254N   ASSIGNMENT 5, SPRING 2018

This assignment is due at 4:00 PM on Monday, April 23rd. Turn in your work, BUT NOT THIS SHEET, to the envelope on the bulletin board next to my office door, 192 Boivin Hall.

1. Solve each of the following initial value problems, **showing your work in the manner and layout shown in class and using correct notation** (see the class notes if you weren't in class.

   (a) $\vec{\mathbf{a}}(t) = \langle 6t - 10, 36e^{3t} \rangle$, $\vec{\mathbf{r}}(0) = \langle 1, -3 \rangle$, $\vec{\mathbf{v}}(0) = \langle 0, 12 \rangle$

   (b) $\vec{\mathbf{a}}(t) = \langle 12e^{-2t}, -50\cos 5t - 2 \rangle$, $\vec{\mathbf{r}}(0) = \langle 1, 2 \rangle$, $\vec{\mathbf{v}}(0) = \langle 1, 0 \rangle$

   (c) $\vec{\mathbf{a}}(t) = \langle 0, -32 \rangle$, $\vec{\mathbf{r}}(0) = \langle 0, 80 \rangle$, $\vec{\mathbf{v}}(0) = \langle 341, 87 \rangle$

2. For each of the following, the velocity and acceleration vectors are given at a particular time. Find the tangential and normal acceleration vectors $\vec{\mathbf{a}}_T$ and $\vec{\mathbf{a}}_N$ at that time, labeling each with correct notation, of course! So, for example, your answers to (a) will be labeled $\vec{\mathbf{a}}_T(3)$ and $\vec{\mathbf{a}}_N(3)$.

   (a) $\vec{\mathbf{v}}(3) = \langle 7, 1 \rangle$, $\vec{\mathbf{a}}(3) = \langle 3, 4 \rangle$ (b) $\vec{\mathbf{v}}(1) = \langle -2, 5 \rangle$, $\vec{\mathbf{a}}(1) = \langle 3, -1 \rangle$