

Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work **correct, complete** and **coherent**.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 12, October 14, 2019

Suppose $\frac{d\vec{r}}{dt} = -t\vec{i} - t\vec{j} - t\vec{k}$ and $\vec{r}(0) = \vec{i} + 2\vec{j} + 3\vec{k}$. Find $\vec{r}(t)$.

ANSWER: Integrate to learn that

$$\vec{r}(t) = -\frac{t^2}{2}\vec{i} - \frac{t^2}{2}\vec{j} - \frac{t^2}{2}\vec{k} + \vec{c}$$

for some constant vector \vec{c} . Plug in $t = 0$ to learn that

$$\vec{i} + 2\vec{j} + 3\vec{k} = \vec{r}(0) = -\frac{0^2}{2}\vec{i} - \frac{0^2}{2}\vec{j} - \frac{0^2}{2}\vec{k} + \vec{c} = \vec{c}.$$

Thus, $\vec{c} = \vec{i} + 2\vec{j} + 3\vec{k}$ and

$$\vec{r}(t) = -\frac{t^2}{2}\vec{i} - \frac{t^2}{2}\vec{j} - \frac{t^2}{2}\vec{k} + \vec{i} + 2\vec{j} + 3\vec{k}.$$

Our answer is

$$\vec{r}(t) = \left(-\frac{t^2}{2} + 1\right)\vec{i} + \left(-\frac{t^2}{2} + 2\right)\vec{j} + \left(-\frac{t^2}{2} + 3\right)\vec{k}.$$