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 10, Monday, October 12, 2020

An object travels in three space. The position vector of the object at time t is

$$\vec{r}(t) = (\sin t)\,\vec{i} + (t^2 - \cos t)\,\vec{j} + e^t\,\vec{k}.$$

Find parametric equations for the line tangent to the path of the object at $t = 0$.

Answer: The position vector of the object at $t = 0$ is

$$\vec{r}(0) = (\sin 0)\,\vec{i} + (0 - \cos 0)\,\vec{j} + e^0\,\vec{k} = -\vec{j} + \vec{k}.$$

The velocity vector of the object at time t is

$$\vec{r}\,'(t) = (\cos t)\,\vec{i} + (2t + \sin t)\,\vec{j} + e^t\,\vec{k}.$$

The velocity vector of the object at time $t = 0$ is

$$\vec{r}\,'(0) = \vec{i} + \vec{k}.$$

The line through $(0, -1, 1)$ parallel to $\vec{i} + \vec{k}$ is

$$\boxed{\begin{cases} x = 0 + t \\ y = -1 + 0t \\ z = 1 + t. \end{cases}}$$