Fall 2020 ENG 5300 Quiz 1 Kevin Weltzin

You must show **all** work to receive full credit. All work is to be your own. 09/28/2020

This is a closed books and notes test. Be organized. Total points: **20** 19:44- 19:57

1. §10.1 Line Integral. Work done by a force. Calculate $\int_C \mathbf{F}(\mathbf{r}) \cdot d\,\mathbf{r}$ for the following data. If $\mathbf{F}$ is a force, this gives the work done in the displacement along C. (Show the details.) 10 points

   $\mathbf{F} = \sin x\ \mathbf{i} + \cos y\ \mathbf{j} + xz\ \mathbf{k}$, $C : \mathbf{r}(t) = t^3\ \mathbf{i} - t^2\ \mathbf{j} + t\ \mathbf{k}$ from $(0, 0, 0)$ to $(1, -1, 1)$.

2. §10.2 Show that the field $\boxed{\mathbf{F}(x,y,z) = \sin y\ \mathbf{i} + (x\cos y + \cos z)\ \mathbf{j} - y\sin z\ \mathbf{k}}$ is conservative and evaluate the integral $\int_C \mathbf{F}\cdot d\mathbf{r}$ along $C:\ \mathbf{r}(t) = \sin t\ \mathbf{i} + t\ \mathbf{j} + 2t\ \mathbf{k},\ \ 0 \le t \le \frac{\pi}{2}$. Show the details of your work. 10 points