

Name: _____

There are 20 points possible on this quiz. This is a closed book quiz and closed note quiz. Calculators are not allowed. If you have any questions, please raise your hand.

1. (7 points) Let $\mathbf{F}(x, y, z) = 2x \sin y \mathbf{i} + (x^2 \cos y + e^z) \mathbf{j} + (ye^z + 1) \mathbf{k}$.

(a) Find a potential for \mathbf{F} .

(b) Use part (a) to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ where C is the curve: $x = t + 1$, $y = \pi t$, and $z = t^2$ for $0 \leq t \leq 1$.

2. (7 points) Evaluate $\oint_C xy \, dx + x^2y \, dy$ where C consists of the curve $y = \sqrt{x}$ from $(0, 0)$ to $(4, 2)$ followed by the line segments from $(4, 2)$ to $(0, 2)$ and from $(0, 2)$ to $(0, 0)$. (You do not need to simplify your answer.)

3. (6 points) Let $\mathbf{F} = ye^x \mathbf{i} + e^x \mathbf{j} + xz \mathbf{k}$.

(a) Find curl \mathbf{F} .

(b) Find div \mathbf{F} .