

Name _____ Date _____

Instructions: Please show all of your work as partial credit will be given where appropriate, **and** there may be no credit given for problems where there is no work shown. All answers should be completely simplified, unless otherwise stated.

1. (10 points) Determine whether $\mathbf{F}(x, y) = (-e^{-x} \ln y)\mathbf{i} + (e^{-x} y^{-1})\mathbf{j}$ is conservative. If so, find f such that $\mathbf{F} = \nabla f$. If not, state that \mathbf{F} is not conservative.

Conservative: True or False (circle one)

If conservative, $f =$ _____

2. (10 points) Show that the line integral is independent of path and then evaluate it.

$$\int_{(0,0,0)}^{(\pi,\pi,0)} (\cos x + 2yz) dx + (\sin y + 2xz) dy + (z + 2xy) dz$$

Prove independence of path:

Evaluate integral:

Answer _____

3. (10 points) Evaluate the line integral $\int_C xz \, dx + (y + z) \, dy + x \, dz$ where C is the curve $x = e^t, y = e^{-t}, z = e^{2t}$ and t goes from 0 to 1.

Answer: _____

4. (10 points) (True or False)

T or F (circle one) There are 8 possible orders of integration for a triple integral.

T or F (circle one) The cross product of two unit vectors is another unit vector.

T or F (circle one) $2+2 = 4$