MATH 11: MULTIVARIABLE CALCULUS
FALL 2018
HOMEWORK #8

Please turn in your completed homework assignment by leaving it in the boxes labeled "Math 11" in the hallway outside of Kemeny 105 anytime before 3:30 p.m. on **Wednesday, November 7**.

Problem 1. Evaluate
$$\int_C xy^3 \, dx + 3x^2y^2 \, dy$$
where C is the boundary of the region in the first quadrant enclosed by the x-axis, the line $x = 1$ and the curve $y = x^3$, traveled counter-clockwise.

Problem 2. Consider the following vector field
$$\mathbf{F} = \left(2x\cos y - 2z^3\right)\mathbf{i} + \left(3 + 2ye^z - x^2\sin y\right)\mathbf{j} + \left(y^2e^z - 6xz^2\right)\mathbf{k}.$$
Is it a conservative vector field? If so, find its potential function.

Problem 3. Let S be the portion of the surface $z = xy$ lying inside the cylinder $x^2 + y^2 \leq 1$. Compute the surface area of S.