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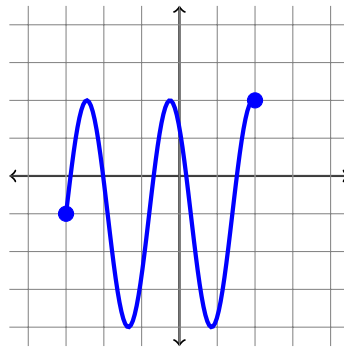
Math 11 Fall 2015, Homework 8, due Wed Nov 11

Please show your work. No credit is given for solutions without work or justification.

(1) Find the integral of the vector field

$$\mathbf{F} = \langle 2x - \pi \sin(\pi y) \sin(\pi x), \pi \cos(\pi y) \cos(\pi x) \rangle$$

over the curve pictured below, oriented from left to right.



- (2) Use a surface integral to find the surface area of the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the circle $x^2 + y^2 = 2$.

- (3) Evaluate the flux of $\mathbf{F} = \langle x, -y, -z \rangle$ through the surface S that consists of the paraboloid $x = y^2 + z^2$ for $0 \leq x \leq 1$. Use outward-facing normal vectors.