Panel 1

Find a conservative vector field that has the given potential:

$$f(z,y,z) = \sin(x^2 + y^2 + z^2)$$

on Monday

Find $div(F)$ and $curl(F) = \nabla \times F$

$$F(x,y,z) = < x^2 z, y^2 x, y + 2z >$$

Evaluate $\int_C (x-y)dx + xdy$ if C is the graph of $y^2 = x$ from (4,-2) to (4,2)

Find the work done by F(x,y,z) along the curve $< t, t^2, t^3 >$ from (0, 0, 0) to (2, 4, 8), where $F(x,y,z) = < y, z, x >$

Check which of the following vector fields is not conservative.

$$F(x,y) = < 3x^2 y + 2, x^3 + 4y^3 >$$

$$F(x,y) = < e^x, 3 - e^x \sin(y) >$$

$$F(x,y,z) = < 8xz, 1 - 6yz^2, 4x^2 - 9y^2 z^z >$$

Show that the line integrals are independent of the path, and find their value:

$$\int_{(-1,2)}^{(3,11)} (y^2 + 2xy)dx + (x^2 + 2xy)dx$$

$$\int_{(1,0,2)}^{(-2,1,3)} (6xy^3 + 2z^2)dx + (9x^2 y^2)dy + (4xz + 1)dz$$

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