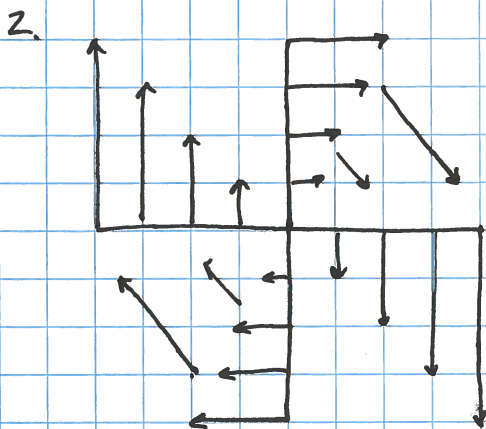
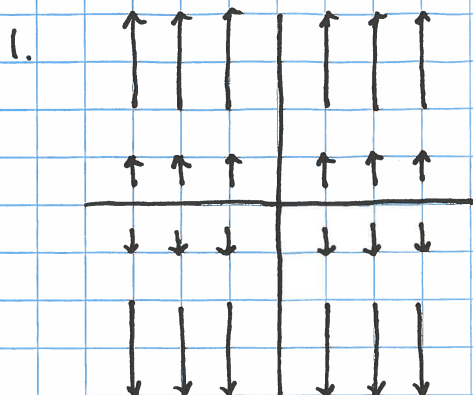


PROBLEM SET 20



3.  $\vec{F}(x,y) = (10x+3y)\hat{i} + (3x+2y)\hat{j}$

4.  $\vec{F}(x,y) = (3\cos 3x)(\cos 4y)\hat{i} - (4\sin 4y)(\sin 3x)\hat{j}$

5.  $\frac{\partial}{\partial y}(xy^2) = 2xy$       AND       $\frac{\partial}{\partial x}(x^2y) = 2xy$

SO THE FIELD IS CONSERVATIVE

6.  $\frac{\partial}{\partial y}(\sin y) = \cos y$       AND       $\frac{\partial}{\partial x}(x \cdot \cos y) = \cos y$

SO THE FIELD IS CONSERVATIVE

7.  $f_x(x, y) = 3x^2y^2$  AND

$f_y(x, y) = 2x^3y$  so

$f(x, y) = x^3y^2 + C$

8.  $f_x(x, y) = 2xy$  AND

$f_y(x, y) = x^2$  so

$f(x, y) = x^2y + C$

9.  $f_x(x, y, z) = xy^2z^2$

$f_y(x, y, z) = x^2yz^2$

$f_z(x, y, z) = x^2y^2z$  so

$f(x, y, z) = \frac{1}{2}x^2y^2z^2 + C$

10.  $f_x(x, y, z) = y^2z^3$

$f_y(x, y, z) = 2xyz^3$

$f_z(x, y, z) = 3xy^2z^2$  so

$f(x, y, z) = xy^2z^3 + C$