Matemáticas 4
Problemario 1
Prof. Gerson Barazarte

3-10 Determine si F es un campo vectorial conservativo o no lo es. Si es así, encuentre una función f tal que F = ∇f.

3.
$$\mathbf{F}(x, y) = (2x - 3y)\mathbf{i} + (-3x + 4y - 8)\mathbf{j}$$

4.
$$\mathbf{F}(x, y) = e^x \operatorname{sen} y \mathbf{i} + e^x \cos y \mathbf{j}$$

5.
$$\mathbf{F}(x, y) = e^x \cos y \, \mathbf{i} + e^x \sin y \, \mathbf{j}$$

6.
$$\mathbf{F}(x, y) = (3x^2 - 2y^2)\mathbf{i} + (4xy + 3)\mathbf{j}$$

7.
$$\mathbf{F}(x, y) = (ye^x + \sin y) \mathbf{i} + (e^x + x \cos y) \mathbf{j}$$

8.
$$\mathbf{F}(x, y) = (2xy + y^{-2})\mathbf{i} + (x^2 - 2xy^{-3})\mathbf{j}, y > 0$$

9.
$$\mathbf{F}(x, y) = (\ln y + 2xy^3) \mathbf{i} + (3x^2y^2 + x/y) \mathbf{j}$$

10.
$$\mathbf{F}(x, y) = (xy \cosh + \operatorname{senh} xy) \mathbf{i} + (x^2 \cos xy) \mathbf{j}$$

$$(x^2 - 2xy^{-3})$$
 j, $y > 0$

16.
$$\mathbf{F}(x, y, z) = (y^2z + 2xz^2)\mathbf{i} + 2xyz\mathbf{j} + (xy^2 + 2x^2z)\mathbf{k}$$
,
 $C: x = \sqrt{t}, y = t + 1, z = t^2, 0 \le t \le 1$

17.
$$\mathbf{F}(x, y, z) = yze^{xz}\mathbf{i} + e^{xz}\mathbf{j} + xye^{xz}\mathbf{k}$$
,
 $C: \mathbf{r}(t) = (t^2 + 1)\mathbf{i} + (t^2 - 1)\mathbf{j} + (t^2 - 2t)\mathbf{k}$, $0 \le t \le 2$

18.
$$\mathbf{F}(x, y, z) = \operatorname{sen} y \mathbf{i} + (x \cos y + \cos z) \mathbf{j} - y \operatorname{sen} z \mathbf{k}$$
, $C: \mathbf{r}(t) = \operatorname{sen} t \mathbf{i} + t \mathbf{j} + 2t \mathbf{k}$, $0 \le t \le \pi/2$

13.
$$\mathbf{F}(x, y) = xy^2 \mathbf{i} + x^2 y \mathbf{j},$$

 $C: \mathbf{r}(t) = \left(t + \sin \frac{1}{2} \pi t, t + \cos \frac{1}{2} \pi t \right), \quad 0 \le t \le 1$

14.
$$\mathbf{F}(x, y) = (1 + xy)e^{xy}\mathbf{i} + x^2e^{xy}\mathbf{j}$$
,
 $C: \mathbf{r}(t) = \cos t \,\mathbf{i} + 2 \sin t \,\mathbf{j} \quad 0 \le t \le \pi/2$

16.
$$\mathbf{F}(x, y, z) = (y^2z + 2xz^2)\mathbf{i} + 2xyz\mathbf{j} + (xy^2 + 2x^2z)\mathbf{k},$$

 $C: x = \sqrt{t}, y = t + 1, z = t^2, 0 \le t \le 1$

17.
$$\mathbf{F}(x, y, z) = yze^{xz}\mathbf{i} + e^{xz}\mathbf{j} + xye^{xz}\mathbf{k}$$
,
 $C: \mathbf{r}(t) = (t^2 + 1)\mathbf{i} + (t^2 - 1)\mathbf{j} + (t^2 - 2t)\mathbf{k}$, $0 \le t \le 2$

18.
$$\mathbf{F}(x, y, z) = \operatorname{sen} y \mathbf{i} + (x \cos y + \cos z) \mathbf{j} - y \operatorname{sen} z \mathbf{k}$$
,
 $C: \mathbf{r}(t) = \operatorname{sen} t \mathbf{i} + t \mathbf{j} + 2t \mathbf{k}$, $0 \le t \le \pi/2$

Grupo 1 Problemas 3 y 8 Grupo 3 Problemas 5 y 16

Grupo 2 Problemas 9 y 17

Grupo 4 Problemas 6 y 15

Grupo 5 Problemas 4 y 17

Grupo 6 Problemas 7 y 18