

Dominio de Funciones

Indicar analíticamente y representar gráficamente el dominio de las siguientes funciones de 2 o más variables:

$$1. \quad z_{(x;y)} = 5x^3 - y^2 + 3$$

$$3. \quad z_{(x;y)} = \arcsen\left(\frac{x}{2}\right) + \sqrt{xy}$$

$$5. \quad z_{(x;y)} = \sqrt{(x^2 + y^2 - a^2) \cdot (2a^2 - x^2 - y^2)}$$

$$7. \quad z_{(x;y)} = \sqrt{\frac{x+y}{x-y}}$$

$$9. \quad z_{(x;y)} = \log(1+xy)$$

$$11. \quad i_{(g,h)} = \sqrt{g^2 - 4} + \sqrt{9 - h^2}$$

$$13. \quad z_{(x;y)} = \arcsen(x+y)$$

$$15. \quad z_{(x;y)} = \frac{\arcsen(y-x^2)}{\sqrt{2-|x|}}$$

$$17. \quad z_{(x;y)} = \frac{\ln(2y-x^2-y^2)}{\cos(\pi x)}$$

$$19. \quad w_{(x;y;z)} = \sqrt{xyz}$$

$$21. \quad w_{(x;y;z)} = \ln(4-x^2-y^2-z^2)$$

$$23. \quad z_{(x;y)} = \ln[(x+3)(y-2)]$$

$$2. \quad z_{(x;y)} = \sqrt{1-x^2-y^2}$$

$$4. \quad z_{(x;y)} = 1 + \sqrt{-(x-y)^2}$$

$$6. \quad z_{(x;y)} = \ln(x^2 + y^2)$$

$$8. \quad z_{(x;y)} = \sen \sqrt{x^2 + y^2 - 1}$$

$$10. \quad z_{(x;y)} = x + \arccos(y)$$

$$12. \quad z_{(x;y)} = \frac{1}{x^2 + y^2}$$

$$14. \quad z_{(x;y)} = \frac{\ln(x+y) \cdot \ln(4-x-y)}{\sqrt{16-x^2-y^2}}$$

$$16. \quad z_{(x;y)} = \frac{\sqrt{2x+2-|y|}}{3y^2+4x-12}$$

$$18. \quad z_{(x;y)} = \ln(1-(x-2)^2-y^2)$$

$$20. \quad w_{(x;y;z)} = \arcsen(x) - \arccos(y) + \arcsen(z)$$

$$22. \quad w_{(x;y;z)} = \sqrt{25-x^2-y^2-z}$$

$$24. \quad w_{(x;y;z)} = \frac{\sqrt{x^2+y^2-4}}{\ln z}$$

Graficar el dominio de los siguientes Campos Vectoriales

$$25. \quad F_{(x;y)} = \begin{pmatrix} \sqrt{x^2+y^2-4} \\ \ln(x+y) \end{pmatrix}$$

$$27. \quad F_{(x;y)} = \begin{pmatrix} \sqrt{x^2+y^2-1} \\ \ln(xy) \end{pmatrix}$$

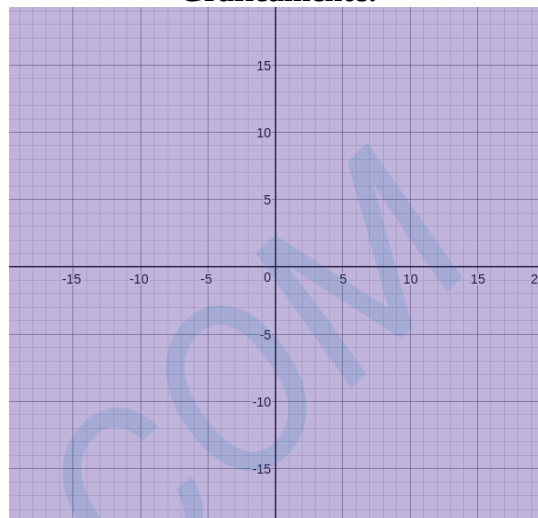
$$26. \quad F_{(x;y;z)} = \begin{pmatrix} \arcsen(x+y) \\ \arccos(x^2+y^2) \end{pmatrix}$$

$$28. \quad F_{(x;y)} = \begin{pmatrix} \arccos(x^2+y^2) \\ \ln(xy-1) \\ x-y \end{pmatrix}$$

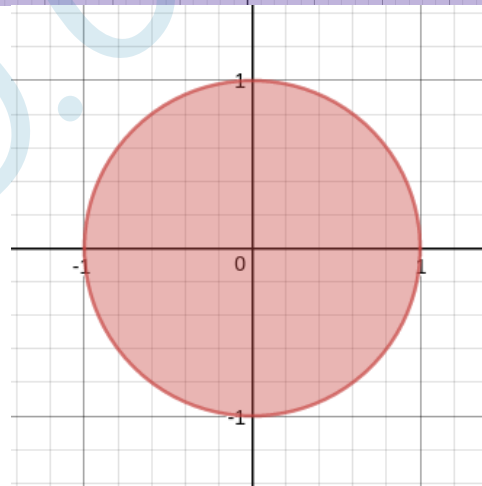
Respuestas

Analíticamente:

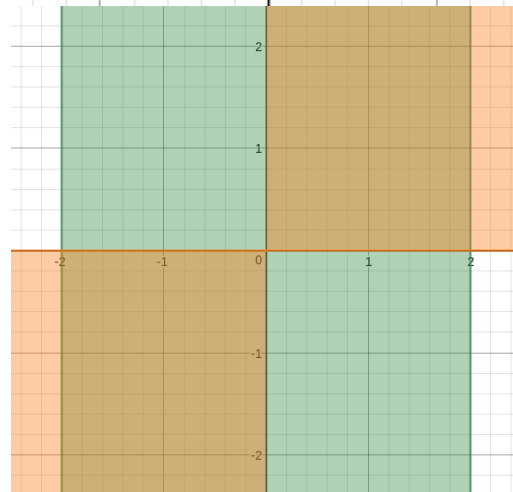
1. $Df = \{(x; y) / (x; y) \in \mathbb{R}\}$

Gráficamente:

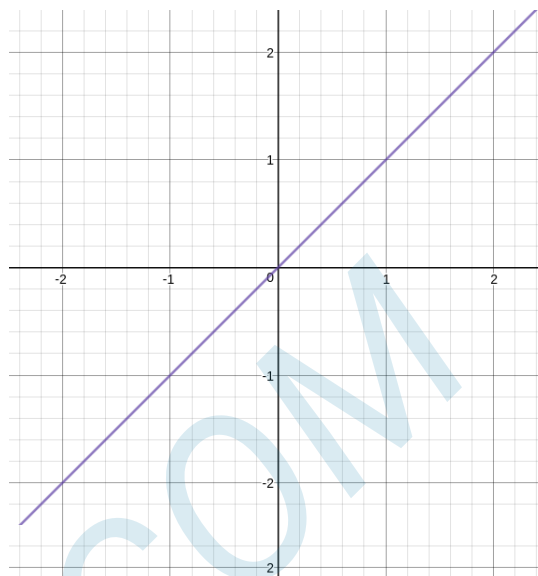
2. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge 1 - x^2 - y^2 \geq 0\}$



3. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge -2 \leq x \leq 2 \wedge xy \geq 0\}$

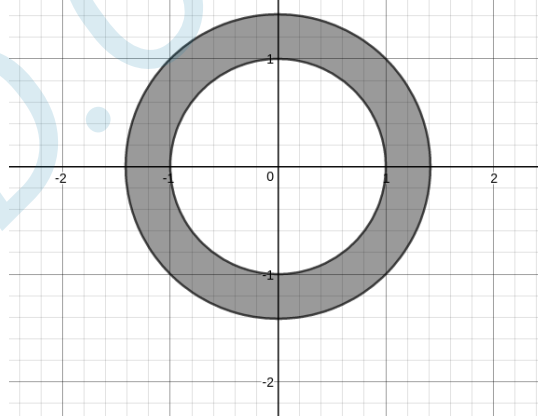


4. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge y = x\}$

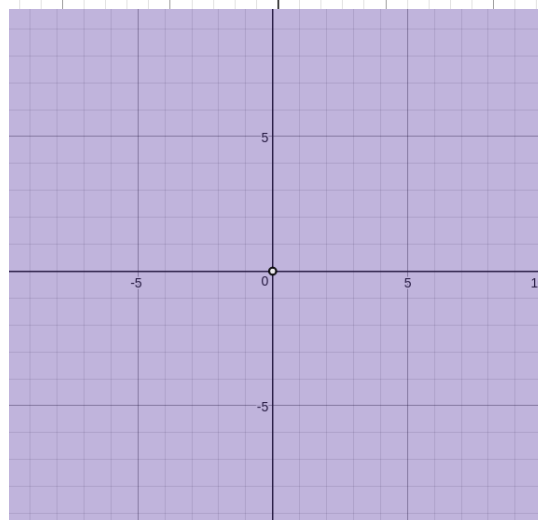


5. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge (x^2 + y^2 - a^2) \cdot (2a^2 - x^2 - y^2) \geq 0\}$

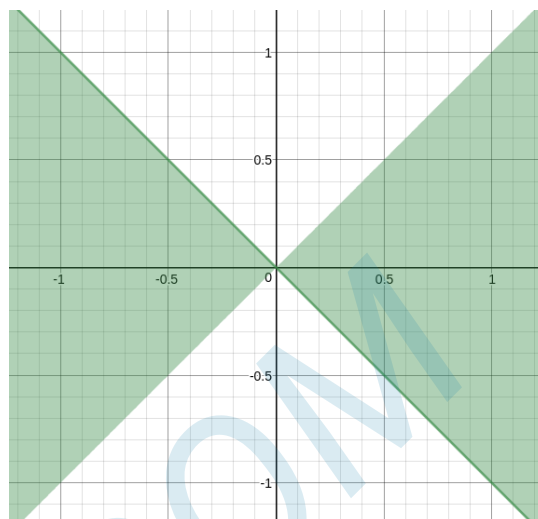
Para el gráfico, $a = 1$



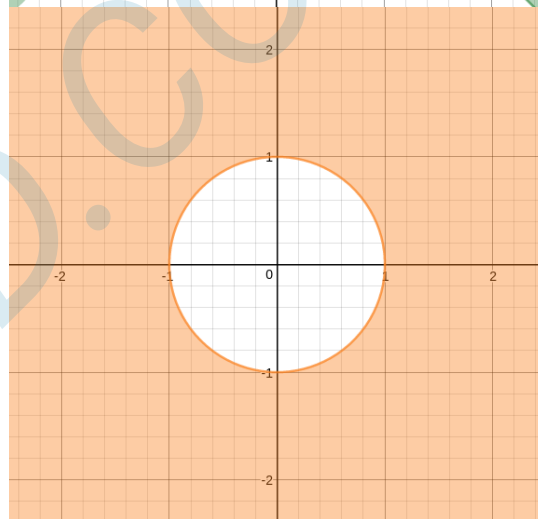
6. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge (x; y) \neq (0; 0)\}$



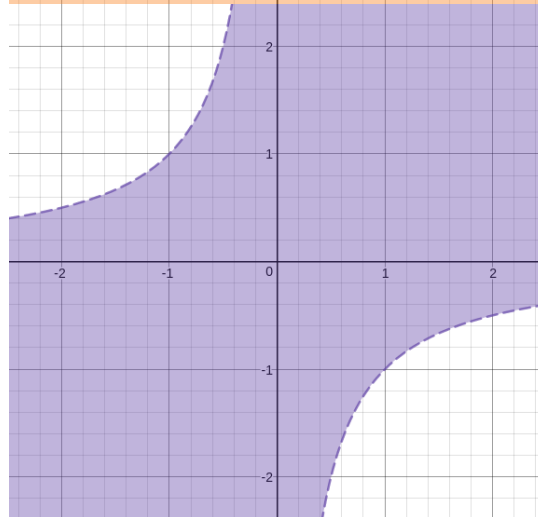
7. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge \frac{x+y}{x-y} \geq 0 \wedge y \neq x\}$



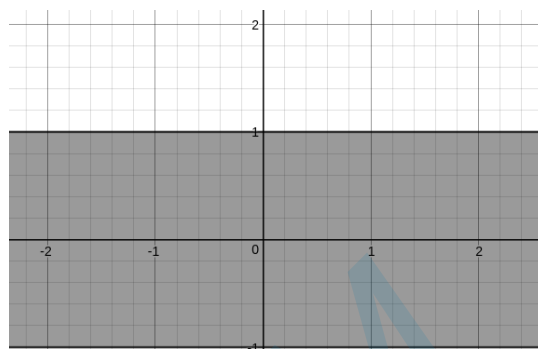
8. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge x^2 + y^2 - 1 \geq 0\}$



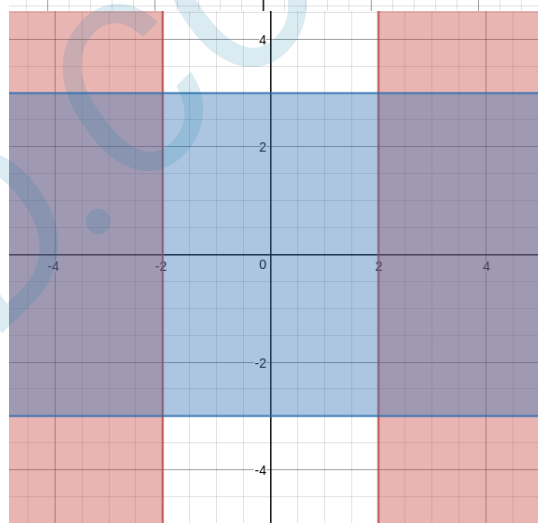
9. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge 1 + xy > 0\}$



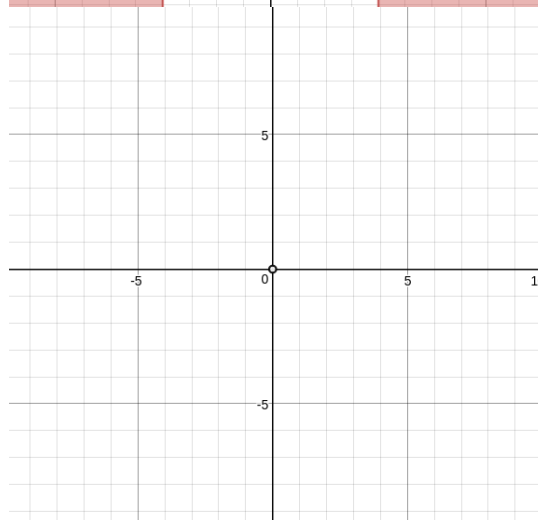
10. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge -1 \leq y \leq 1\}$



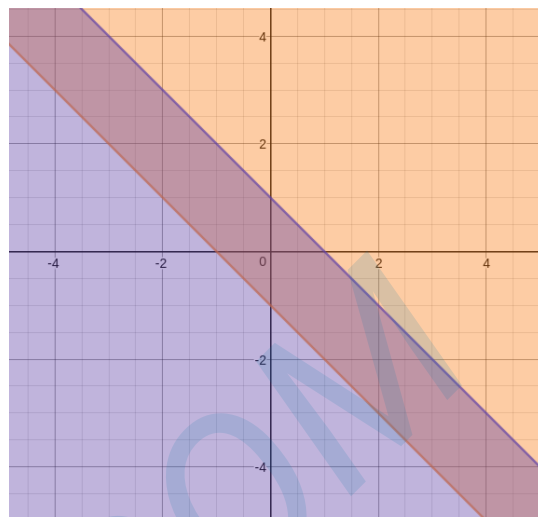
11. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge g^2 - 4 \geq 0 \wedge 9 - h^2 \geq 0\}$



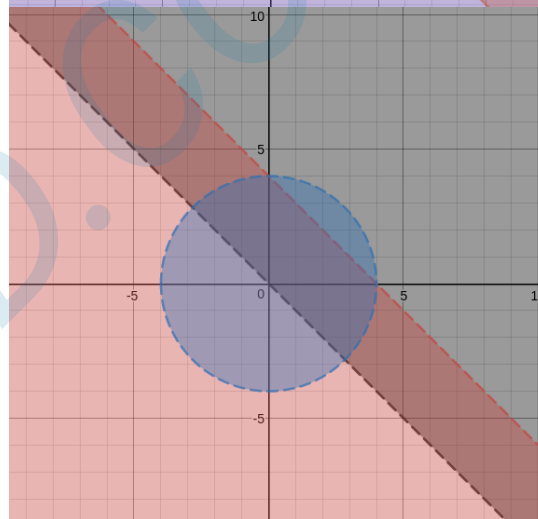
12. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge (x; y) \neq (0; 0)\}$



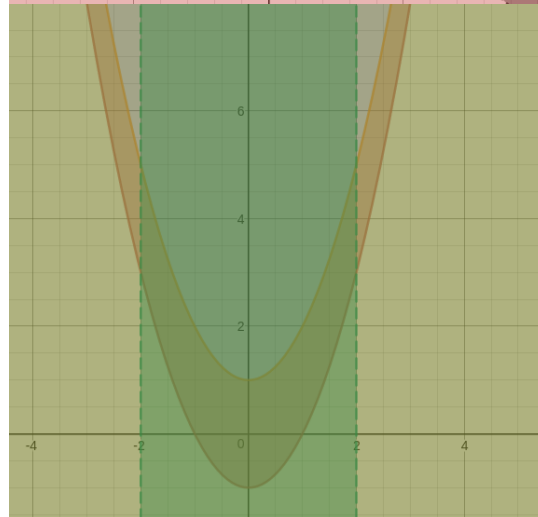
13. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge -1 \leq x + y \leq 1\}$



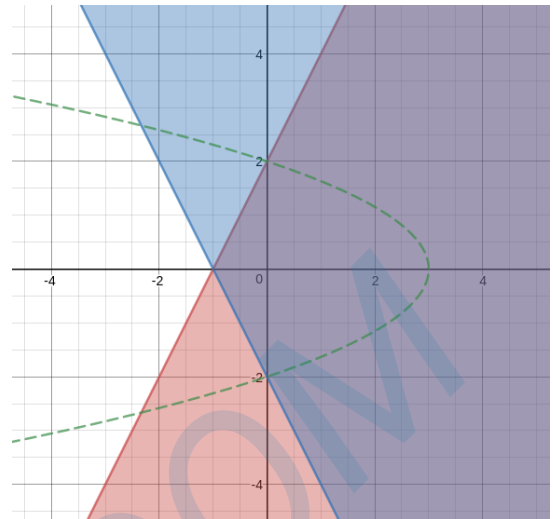
14. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge x + y > 0 \wedge 4 - x - y > 0 \wedge 16 - x^2 - y^2 > 0\}$



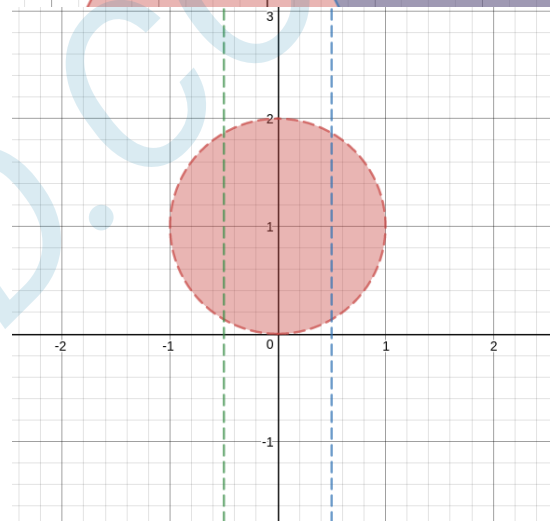
15. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge -1 \leq y - x^2 \leq 1 \wedge 2 - |x| > 0\}$



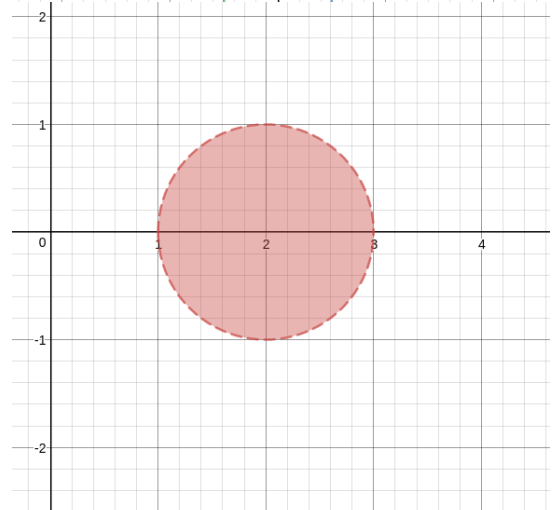
16. $Df = \{(x; y) / (x; y) \in \mathbb{R}^2 \wedge 2x + 2 - |y| \geq 0 \wedge 3y^2 + 4x - 12 \neq 0 \in \mathbb{R}\}$



17. $Df = \{(x; y) / (x; y) \in \mathbb{R}^2 \wedge 2y - x^2 - y^2 > 0 \wedge x \neq \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{5}{2}, \dots, \pm \frac{2n+1}{2}\}$



18. $Df = \{(x; y) / (x; y) \in \mathbb{R}^2 \wedge 1 - (x-2)^2 - y^2 > 0\}$



19. $Df = \{(x; y; z) / (x; y; z) \in \mathbb{R}^3 \wedge xyz \geq 0\}$

1^{er} Octante: $x \geq 0 \wedge y \geq 0 \wedge z \geq 0$

3^{er} Octante: $x \leq 0 \wedge y \leq 0 \wedge z \geq 0$

6^{to} Octante: $x \leq 0 \wedge y \geq 0 \wedge z \leq 0$

8^{vo} Octante: $x \geq 0 \wedge y \leq 0 \wedge z \leq 0$

20. $Df = \{(x; y; z) / (x; y; z) \in \mathbb{R}^3 \wedge -1 \leq x \leq 1 \wedge -1 \leq y \leq 1 \wedge -1 \leq z \leq 1\}$

Los puntos interiores a un cubo de arista igual a 2, centrado en el origen.

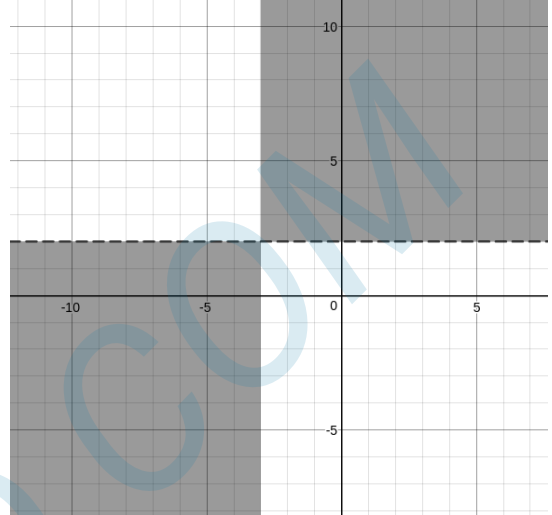
21. $Df = \{(x; y; z) / (x; y; z) \in \mathbb{R} \wedge 4 - x^2 - y^2 - z^2 > 0\}$

Los puntos interiores a una esfera de radio igual a 2, sin incluir la superficie de la esfera.

22. $Df = \{(x; y; z) / (x; y; z) \in \mathbb{R} \wedge 25 - x^2 - y^2 - z \geq 0\}$

Los puntos dentro de un paraboloide de vértice 25, orientado hacia abajo.

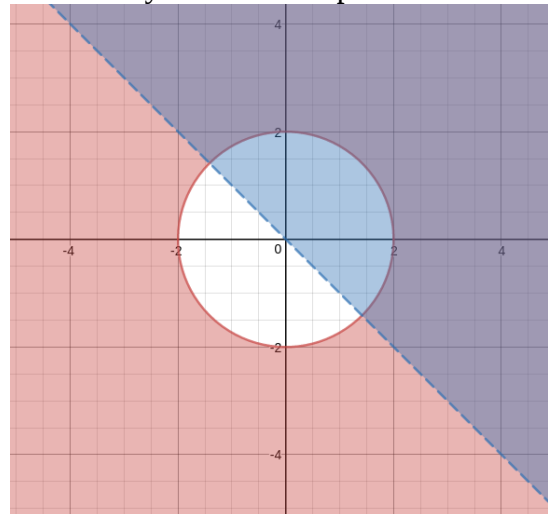
23. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge (x+3)(y-2) > 0\}$



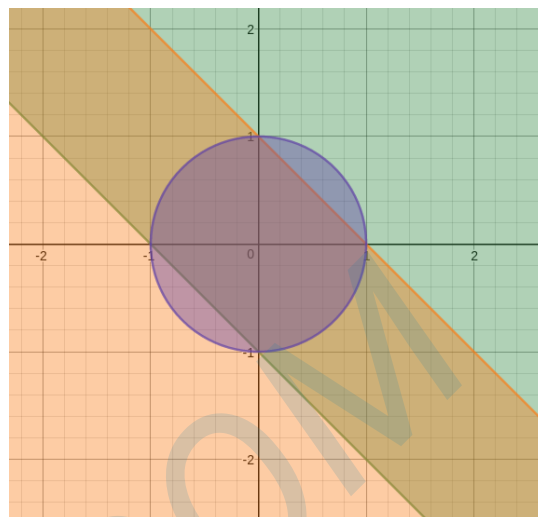
24. $Df = \{(x; y; z) / (x; y; z) \in \mathbb{R} \wedge x^2 + y^2 - 4 \geq 0 \wedge z > 0 \wedge z \neq 1\}$

Los puntos fuera del cilindro de radio 2 (pero incluyendo el cilindro) y centrado en el origen, por encima del plano $z=0$ y sin incluir el plano $z=1$.

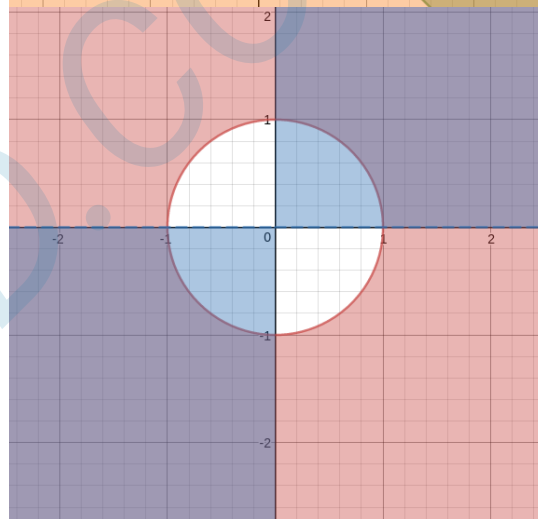
25. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge x^2 + y^2 - 4 \geq 0 \wedge x + y > 0\}$



26. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge -1 \leq x + y \leq 1 \wedge x^2 + y^2 \leq 1\}$



27. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge x^2 + y^2 - 1 \geq 0 \wedge xy > 0\}$



28. $Df = \{(x; y) / (x; y) \in \mathbb{R} \wedge x^2 + y^2 \leq 1 \wedge xy - 1 > 0\}$

Tener en cuenta que NO hay intersección para las 2 condiciones, por ende el dominio es un conjunto vacío (la gráfica solamente muestra esta situación)

