

Trovare e disegnare i seguenti sottoinsiemi di $\mathbf{R}^2$, dire se sono aperti, chiusi oppure né aperti né chiusi. Infine trovarne la parte interna, la chiusura, la frontiera.

1. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 \leq 1\}$
2. $\{(x, y) \in \mathbf{R}^2 \mid (x-1)^2 + (y-2)^2 < 1\}$
3. $\{(x, y) \in \mathbf{R}^2 \mid 2x^2 + y^2 \leq 1\}$
4. $\{(x, y) \in \mathbf{R}^2 \mid |x|^p + |y|^p \leq 1\}, \quad p > 0$
5. $\{(x, y) \in \mathbf{R}^2 \mid \max\{|x|, |y|\} \leq 1\}$
6. $\{(x, y) \in \mathbf{R}^2 \mid |x| + |y| \leq 1\}$
7. $\{(x, y) \in \mathbf{R}^2 \mid 2 \leq x \leq 5, 1 \leq y \leq 2\}$
8. $\{(x, y) \in \mathbf{R}^2 \mid x+2 \leq y \leq x+3, -2x < y < -2x+2\}$
9. $\left\{(x, y) \in \mathbf{R}^2 \mid \frac{1}{x} < y < \frac{2}{x}, x < y < 2x\right\}$
10. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 \leq 1, y - |x| \leq 0\}$
11. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 \leq 1, |y| - |x| \leq 0\}$
12. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 \leq 1, |y| - |x| > 0\}$
13. $\{(x, y) \in \mathbf{R}^2 \mid y \leq 0, y \geq 0\}$
14. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 = 1\}$
15. $\{(x, y) \in \mathbf{R}^2 \mid x^2 + y^2 = 1, |x| = |y|\}$

15. - 21. Trovare una parametrizzazione per il bordo degli insiemi **1. - 6.**

Immaginare e disegnare i seguenti sottoinsiemi di $\mathbf{R}^3$, dopodiché dire se sono aperti, chiusi oppure né aperti né chiusi. Infine trovarne la parte interna, la chiusura, la frontiera.

21. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 + z^2 \leq 1\}$
22. $\{(x, y, z) \in \mathbf{R}^3 \mid (x-1)^2 + (y-2)^2 + (z-3)^2 \geq 1\}$
23. $\{(x, y, z) \in \mathbf{R}^3 \mid 2x^2 + y^2 + z^2 < 1\}$

24. $\{(x, y, z) \in \mathbf{R}^3 \mid |x|^p + |y|^p + |z|^p \leq 1\}, \quad p > 0$
25. $\{(x, y, z) \in \mathbf{R}^3 \mid \max\{|x|, |y|, |z|\} \leq 1\}$
26. $\{(x, y, z) \in \mathbf{R}^3 \mid |x| + |y| + |z| \leq 1\}$
27. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 \leq 1\}$
28. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 = 1\}$
29. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 \leq 1, \ 0 \leq z \leq 1\}$
30. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 = 1, \ 0 \leq z \leq 1\}$
31. $\{(x, y, z) \in \mathbf{R}^3 \mid x^2 + y^2 = 1, \ 0 < z < 1\}$
32. $\{(x, y, z) \in \mathbf{R}^3 \mid z^2 \geq x^2 + y^2\}$
33. $\{(x, y, z) \in \mathbf{R}^3 \mid z^2 \geq x^2 + y^2, \ x^2 + y^2 + z^2 \leq 1\}$
34. $\{(x, y, z) \in \mathbf{R}^3 \mid z^2 \geq x^2 + y^2, \ x^2 + y^2 + z^2 \leq 1, \ z \geq 0\}$
35. $\left\{(x, y, z) \in \mathbf{R}^3 \mid z^2 \geq x^2 + y^2, \ x^2 + y^2 + z^2 \leq 1, \ 0 \leq z \leq \frac{1}{\sqrt{2}}\right\}$

Disegnare e parametrizzare la seguente curva in $\mathbf{R}^3$

36. $\{(x, y, z) \in \mathbf{R}^3 \mid z^2 = x^2 + y^2, \ x^2 + y^2 + z^2 = 1, \ z \geq 0\}$