

1 . Resolver las siguientes inecuaciones

1. $2(x-3) > 5$
2. $2(x-) \leq 5$
3. $x+3 \geq 2(x+1)$
4. $(x+1)^2 \geq x^2$
5. $(x-1)^2 < x^2$
6. $(x+2)^3 > x^3 + (\sqrt{6}x-1)^2$
7. $x^3 - (x+2)^3 > -(\sqrt{6}x-1)^2$
8. $(x+3)^3 \geq x^3 + (3x+2)^2$
9. $3[(x+3)^2 + x(x+3) + x^2] < (3x+2)^2$
10. $(2x+5)^3 - (2\sqrt{15}x+20)^2 \leq 8x^3$
11. $\frac{x+1}{2} \leq \frac{x}{3} + 1$
12. $\frac{x+1}{2} - \frac{x}{3} > 1$
13. $\frac{3x^2}{2} + \frac{(x-1)^2}{2} > 2x^2 + \frac{x+1}{4}$
14. $\frac{6x^2 - (x+1)}{4} - 2x^2 \leq -\frac{(x-1)^2}{2}$
15. $\frac{(2x+3)^3}{8} \geq x^3 + \frac{9x^2}{2} + 1$
16. $(3+2\sqrt{3})x^2 + \frac{3x^6-1}{3} \leq (x^2+1)^2 - (\sqrt{3}x^2-1)^2 - 1$
17. $(\sqrt{3}x^2-1)^2 + (3+2\sqrt{3})x^2 > (x^2+1)^2 - \frac{3x^6+2}{3}$
18. $(3+2\sqrt{3})x^2 + \frac{x}{6} > (x^2+1)^3 - (\sqrt{3}x^2-1)^2 - \frac{3x^6-1}{3}$

2 . Resolver las siguientes inecuaciones

1. $(x-1)(x-2) < 0$
2. $(x-1)(x-2) \leq 0$
3. $(x-1)(x-2) > 0$
4. $(x-1)(x-2) \geq 0$
5. $(x^2+1)(x-2) \geq 0$
6. $(x^2+1)(x-2) \leq 0$
7. $(x+1)(x+2)(x-2) < 0$
8. $(x+3)(x+1)x \geq 0$
9. $(2x^2+1)(3x^4+1)(2x-1) \leq 0$
10. $(2x+1)(3x+1)x < 0$
11. $(x-1)^2(x-3)^4(x+2)(2x+1) \leq 0$
12. $(x^2+1)^3(x+2)(x-1)^2 \geq 0$
13. $x^2+5x+6 \geq 0$
14. $2x^2+5x+2 \leq 0$

15. $x^2 + \frac{5}{2}x + 1 < 0$
16. $x^2 - 2 \geq 0$
17. $x^4 > 16$
18. $x^3 \leq 1$
19. $(x^2+3)(x^2-2) \geq 0$
20. $(2x^2-1)(x^3-27) \leq 0$
21. $x^8 \leq 1$
22. $2x^3 - x + 1 > 0$
23. $x^2 + \frac{x^2(2x+1)}{12} \leq (x+1)(x-1)$
24. $x^3(x-1) \geq 7x^2 - x - 6$
25. $2x^4 - x^3 - 35x^2 - 47x - 15 \leq 0$
26. $(x+1)^2[2(x+1)-47] < 9x^3 - 39x - 30$
27. $x^5 + 2x^4 - x - 2 \geq 0$
28. $x^5 - 3x^4 - 4x^3 < x(45 - 12x) - 135$
29. $x^3(x^2 - 3x - 4) \leq 3(15x - 4x^2 - 45)$
30. $8x^3 + 4x^2 - 2x - 1 \geq 0$
31. $(x+1)^3 - \frac{x(14x+13)}{4} > \frac{7}{8}$
32. $12x^3 - 4x^2 < 3x - 1$
33. $27x^3 + 9x^2 - 3x - 1 \geq 0$
34. $27x^3 - 9x^2 - 3x + 1 \geq 0$
35. $x^3 + \frac{(x-1)^2}{6} \leq \frac{2-x}{9}$
36. $(x+1)(4x^3 - 7x + 7) \geq -(6x+5)$
37. $6x^5 - 5x^4 - 6x^3 + 6x^2 - 5x - 6 \leq 0$
38. $90x^4 - 27x^3 - 49x^2 + 12x + 4 \geq 0$
39. $x^4 + 3x^3 + 4x^2 + 3x + 1 \geq 0$
40. $x^3(x+3) \leq 5x + 3 - 4(x+1)^2$
41. $x^4 + x^3 + 2x^2 + x + 1 > 0$
42. $x^4 + x^3 + x + 1 \leq 0$
43. $x^4 - 4x^3 + 1 \leq 4x - 5x^2$
44. $\frac{(x+1)^4}{28} \geq \frac{x(x^2+1)}{4} + \frac{x^2}{7}$
45. $2(x^5+1) + 11x(x^3+1) + 17x^2(x+1) \geq 0$
46. $x(3x^4+5x^2+x+7) \geq (x+1)^2(x^2+3)$
47. $2x^5+x^4+3x^3+3x^2+x+2 \leq 0$
48. $3x^5+5x^4-5x^3+5x^2-5x-3 < 0$
49. $6x^6-13x^5+12x^4-13x^3+12x^2-13x+6 \geq 0$
50. $x^6-5x^5+x^4-x^2+5x-1 \geq 0$

Observación: En los polinomios, deben hallarse todas las raíces, inclusive las imaginarias, ya que puede haber alternancia entre las soluciones reales y las complejas

3. Resolver las siguientes inecuaciones racionales

1. $\frac{(x+1)(x-2)}{x-5} > 0$
2. $\frac{(x+1)(x-2)}{x-5} \geq 0$
3. $\frac{(x+1)(x-2)}{x-5} < 0$
4. $\frac{(x+1)(x-2)}{x-5} \leq 0$
5. $\frac{(x+1)^2(x+3)(x-1)}{(x-1)} < 0$
6. $\frac{(x+2)(x-1)(x-3)}{(x+1)^2} \leq 0$
7. $\frac{(x+2)^3(x+1)(x-3)}{(x-1)^2(x-2)} \geq 0$
8. $\frac{x(x+1)^2(x-2)^4}{(x+\sqrt{2})^2} > 0$
9. $\frac{(2x+1)(3x-1)^2}{x^3(\sqrt{2}x-1)} \leq 0$
10. $\frac{-3x(3x+1)^2(x+2)}{(x+2)^3} \geq 0$
11. $\frac{(x^2-x-2)(x-1)}{x^2+2x-3} < 0$
12. $\frac{(x^2+5x+6)(2x^2+5x+2)}{x^2-5x+6} \leq 0$
13. $\frac{(2x^2-1)(x^3-1)}{x^2+x-2} < 0$
14. $\frac{x^3(x^2+2x+1)}{x^3+x^2-x-1} \leq 0$
15. $\frac{2x^3-x+1}{x^3+2x+x-4} \geq 0$
16. $\frac{2x^4-x^3-35x^2-47x-15}{x^5+2x^4-x-2} > 0$
17. $\frac{x^4+x^3+2x^2+x+1}{x^4+x^3+x+1} \geq 0$
18. $\frac{2x^5+x^4+3x^3+3x^2+x+2}{x^6-5x^5+x^4-x^2+5x-1} \geq 0$
19. $x^3 \geq \frac{7x^2-x-6}{x-1}$
20. $x^3 \leq \frac{7x^2-x-6}{x-1}$
21. $\frac{x}{x^2-1} + 3 \leq \frac{1}{x-1} - \frac{x}{x+1}$
22. $\frac{x}{x^2-1} + \frac{x}{x+1} \geq \frac{1}{x-1} - 3$
23. $\frac{1}{x^2+5x+6} + \frac{x-1}{x+2} \geq \frac{1}{x-5} - \frac{4}{3}$
24. $\frac{1}{x^2+5x+6} + \frac{4}{3} \leq \frac{1}{x-5} - \frac{x-1}{x+2}$

4. Resolver las siguientes inecuaciones con radicales

1. $\sqrt{x-1} > 1$
2. $\sqrt{x-1} \geq 1$
3. $\sqrt{x-1} < 1$
4. $\sqrt{x-1} \leq 1$
5. $\sqrt{x+4} > 1$
6. $\sqrt{x+4} \leq 1$
7. $2\sqrt{x-3} \geq \sqrt{x+9}$
8. $2\sqrt{2x} \geq \sqrt{2x+12}$
9. $2\sqrt{x-3} < \sqrt{x+9}$
10. $2\sqrt{x} \leq \sqrt{x+6}$
11. $\sqrt{x^2+2x-3} > -x-2$
12. $\sqrt{x^2+2x-3} \leq -x-2$
13. $\sqrt{3-2x-x^2} > -x-2$
14. $\sqrt{3-2x-x^2} \leq -x-2$
15. $\sqrt{x^2+2x-3} > -x+2$
16. $\sqrt{x^2+2x-3} \leq -x+2$
17. $\sqrt{x^2+x-2} \geq \sqrt{2}(x-1)$
18. $2\sqrt{3}\sqrt{x-2} \geq \sqrt{3}\sqrt{x+10}$
19. $2\sqrt{3}\sqrt{x-2} \leq \sqrt{3}\sqrt{x+10}$
20. $\sqrt{2x^2+\sqrt{2}x-2} \geq \sqrt{2}(\sqrt{2x-1})$
21. $\sqrt{2x^2+\sqrt{2}x-2} \leq 2x-\sqrt{2}$
22. $\sqrt{(x-1)(x-2)(x-3)} \leq \sqrt{x+2}$
23. $\sqrt{(x-1)(x-2)(x-3)} \geq \sqrt{x+2}$
24. $\sqrt{x^3-x} \leq \sqrt{x+4}$
25. $\sqrt{x^3-x} \geq \sqrt{x+4}$
26. $\sqrt{x-2} + \sqrt{x+3} \leq \sqrt{4x+1}$
27. $\sqrt{2x-3} + \sqrt{2x+2} \geq \sqrt{8x-3}$
28. $\sqrt{3-\sqrt{x-3}} \geq \sqrt[4]{x}$
29. $\sqrt{3-2\sqrt{2}x} \leq \sqrt[4]{2x+3}$
30. $\sqrt{3-\sqrt{2-y}} \leq \sqrt[4]{5-y}$
31. $\sqrt{x^2+2x-3} + 1 \geq \sqrt{x^2+2x-8}$
32. $\sqrt{y^2+4y+1} \leq \sqrt{y^2+4y-5}$
33. $\sqrt{y^2-6y+5} + 1 \geq \sqrt{y^2-6y}$
34. $\sqrt{x^4-18} \geq \sqrt{27x+7x^2-3x^3}$
35. $\sqrt{x^4-18} \leq \sqrt{27x+7x^2-3x^3}$
36. $\sqrt[4]{x+15} > \sqrt{3x+1}$
37. $\sqrt[4]{x} \leq \sqrt{3x-44}$
38. $\sqrt{2x-1} + \sqrt{2x+6} > \sqrt{9x+4}$
39. $\sqrt{x^2+x-2} + \sqrt{x-2} \geq \sqrt{x^2+x-6} + \sqrt{x+2}$
40. $\sqrt{x^2+x-2} + \sqrt{x-2} \leq \sqrt{x^2+x-6} + \sqrt{x+2}$

5. Resolver los siguientes sistemas de inecuaciones:

$$1. \begin{cases} \frac{5x-66}{10} < \frac{x-3}{5} \\ 2x+1 \geq 3 \end{cases}$$

$$2. \begin{cases} \frac{x+3}{2} + \frac{3-x}{5} < \frac{81}{10} \\ x^2+3 \geq (x+1)^2 \end{cases}$$

$$3. \begin{cases} \sqrt{x^2+40} > x+4 \\ \sqrt{x-2} + \sqrt{x+2} \leq 2 \end{cases}$$

$$4. \begin{cases} \sqrt{x^2+40} < x+4 \\ \sqrt{x-2} + \sqrt{x+2} \geq 2 \end{cases}$$

$$5. \begin{cases} \frac{x+1}{2} \leq \frac{x}{3} + 1 \\ (x+3)^2 - (3x+2)^2 \geq x^3 \end{cases}$$

$$6. \begin{cases} \frac{(2x+3)^3 - 8}{8} \geq \frac{2x^3 + 9x^2}{2} \\ \frac{x+1}{2} - 1 > \frac{x}{3} \end{cases}$$

$$7. \begin{cases} \frac{(2x+1)(x^2+1)(1-3x)^2}{x^3(\sqrt{2}x-1)} \leq 0 \\ \frac{(1-x)(x^2-x-2)}{x^2+2x-3} < 0 \end{cases}$$

$$8. \begin{cases} \frac{x}{x^2-1} + \frac{x}{x+1} \leq \frac{1}{x-1} - 3 \\ \frac{1}{x-5} - \frac{4}{3} \leq \frac{x-1}{x+2} + \frac{1}{x^2+5x+6} \end{cases}$$

$$9. \begin{cases} 2\sqrt{x-3} < \sqrt{x+9} \\ x+2 + \sqrt{3-2x-x^2} > 0 \end{cases}$$

$$10. \begin{cases} \frac{1}{2}\sqrt{x+9} > \sqrt{x-3} \\ x+2 + \sqrt{3-2x-x^2} \leq 0 \end{cases}$$

$$11. \begin{cases} x + \sqrt{x^2+2x-3} > 2 \\ \sqrt{2} + \sqrt{2x^2+\sqrt{2}x-2} \leq 2x \end{cases}$$

$$12. \begin{cases} \sqrt{3\sqrt{x+10}} \leq \sqrt{2\sqrt{3}\sqrt{x-2}} \\ \sqrt{x+4} \leq \sqrt{x^3-x} \end{cases}$$

$$13. \begin{cases} (x+1)(x+2)(2-x) > 0 \\ (x+3)(x+1) \geq 0 \end{cases}$$

$$14. \begin{cases} (x+2)(2x+1)(3-x)^4(1-x)^2 \leq 0 \\ 2x^2+2 \leq -5x \end{cases}$$

$$15. \begin{cases} x^2 \geq 2 \\ x^3 \leq 1 \end{cases}$$

$$16. \begin{cases} 2x^4 \leq x^3 + 35x^2 + 47x + 15 \\ 4(2x^3 + x^2) \geq 2x + 1 \end{cases}$$

$$17. \begin{cases} \frac{(x+1)^4 - 4x^2}{28} \geq \frac{x(x^2+1)}{4} \\ \frac{6x^3 + (x-1)^2}{6} \geq \frac{x-2}{9} \\ x^2 - 4 \geq 0 \end{cases}$$

$$18. \begin{cases} \frac{(1+x)(2-x)}{5-x} \leq 0 \\ \frac{(2+x)(1-x)(3-x)}{(1+x)^2} \leq 0 \\ \sqrt{x^2+1} > 1 \end{cases}$$

6. Resolver las siguientes Inecuaciones con valor absoluto:

$$1. |x-2| < 3$$

$$2. |x-2| > 3$$

$$3. |x+1| \leq 3$$

$$4. |x^2-1| < 2$$

$$5. |1-x^2| \leq 2$$

$$6. |x^2-1| > 5$$

$$7. |x^2-2x+1| < 2$$

$$8. |x^2+1-2x| \geq 2$$

$$9. |x^2+x-2| < 2$$

$$10. |x^4-1| \leq 3$$

$$11. |1-x^4| > 4$$

$$12. 3 < |x^2-1| < 5$$

$$13. |x^3+2x-1| \geq x^3-3$$

$$14. |1-2x-x^3| \geq x^3-3$$

$$15. |x^3-3x-5| \leq x^3+6$$

$$16. |5+3x-x^2| \geq 6+x^3$$

$$17. |x(x+1)(x+2)| < x+2$$

$$18. \left| \frac{x+1}{x-1} \right| < 2$$

$$19. \left| \frac{x-1}{x+1} \right| > \frac{1}{2}$$

$$20. \left| \frac{1+x}{1-x} \right| > 2$$

$$21. \left| \frac{1-x}{1+x} \right| < \frac{1}{2}$$

Inecuaciones

$$22. \left| \frac{x^2+x+1}{x+1} \right| < \frac{3}{2}$$

$$23. \left| \frac{x+1}{x^2+x-1} \right| < 2$$

$$24. \left| \frac{x^2+x-3}{x-1} \right| < x$$

$$25. \left| \frac{x-3+x^2}{1-x} \right| \geq x$$

$$26. \left| \frac{x+1}{1-x-x^2} \right| > 2$$

$$27. \left| \frac{x^2+x-1}{1+x} \right| > \frac{1}{2}$$

$$28. \left| \frac{1-x-x^2}{x+1} \right| < \frac{1}{2}$$

$$29. |x-3| < |2x+1|$$

$$30. |3-x| > |-2x-1|$$

$$31. |x-5| > |3x-1|$$

$$32. |5-x| \leq |1-3x|$$

$$33. |x^2-2| \leq |3x-2|$$

$$34. |2-3x| < |x^2-2|$$

$$35. \left| \frac{x^2-2}{3x-2} \right| < 1$$

$$36. \left| \frac{4x^2-4x-1}{6x-5} \right| < 1$$

$$37. \left| \frac{3x-2}{x^2-2} \right| > 1$$

$$38. \left| \frac{x^2+3x-4}{x^2-x-2} \right| > 2$$

$$39. \left| \frac{x^2+3x-4}{x^2-x-2} \right| < 2$$

$$40. |x+2| < |x+1| + |2x-3|$$

$$41. |x-1| > |x-2| + |2x-9|$$

$$42. |x| - |x-1| \geq |2x-7|$$

$$43. |4x+1| - 4|x| - |8x-5| \geq 0$$

$$44. \frac{1}{2}|x| + |x-5| \leq \frac{1}{2}|x+2|$$

$$45. |x| + 2|5-x| > |x+2|$$

$$46. |x+1| + |x| + |x-3| < |x-10|$$

$$47. |x+11| - |x| < -(|x+10| + |x+7|)$$

$$48. |x^2| - |x^2-1| \geq |2x^2-7|$$

$$49. |x^3+2| + |5-x^3| - |x^3+2| > 0$$

$$50. |x+1| + |x| + |x-3| + |x-4| < 10$$

$$51. |x+1| + |x| + |x-4| + |x-6| < 100$$

$$52. |x^2-2| + |x^2-3| + |x^2-7| + |x^2-9| < 100$$

$$53. |x^3+1| + |x^3| + |x^3-4| + |x^3-6| < 100$$

$$54. \left| \frac{x^2+2| - |x^2+1|}{2x^2-3} \right| < 1$$

$$55. \left| \frac{|x^2| - |2x^2-7|}{x^2-1} \right| \geq 1$$

$$56. \left| \frac{2x^2+x-1}{x^2-x-2} \right| < -1$$

$$57. \left| \frac{2x^2+x-1}{x^2-2-x} \right| + 1 > 0$$

$$58. \left| \frac{x^2-x-2}{1-x-2x^2} \right| > 1$$

$$59. \left| \frac{x^2-5x+7}{2x^2+13x+20} \right| + 1 < 0$$

$$60. \left| \frac{x^4-x^2-2}{1-x^2-2x^4} \right| - 1 > 0$$

$$61. 3 < \left| \frac{x+1}{x-5} \right| < 5$$

$$62. 6 < \left| \frac{2x^2}{x^2-6} \right| < 10$$

$$63. \frac{1}{5} < \left| \frac{x^2-10}{x^2+2} \right| < \frac{1}{3}$$

$$64. \sqrt{|x+1|} < 2$$

$$65. \sqrt{|x+1|} > 2$$

$$66. \sqrt{|x^2+x-2|} < 2$$

$$67. 1 < \sqrt{|x^2+x-6|} < 6$$

$$68. \sqrt{x^2+x+7} > |3x|$$

$$69. \sqrt{|x^4+3x^2-4|} < 6$$

$$70. 0 < \frac{\sqrt{|x^2-1|}}{x^2-1} < 1$$

$$71. 0 < \frac{x^2-1}{\sqrt{|x^2-1|}} < 1$$

$$72. \sqrt{|x-4|} + \sqrt{x} > 2$$

$$73. |1 - \sqrt{|4-x^2|}| \leq 1$$