

1. Resuelve la ecuación:

- $2(2x-3)-3(3x-2)+17x^2-16 = x^4-5x$
- $x^2(x^2+x)-x^4+5x^2 = 2x^3(2x-1)+3x^3+1$
- $3x^4-3x^2(x^2-x)-6x^3-9 = x^3(x-3)-10x^2$
- $x^3(x+3)-x^3(2x+1)-20x^2+64 = 2x^3-2x^4$
- $8x^3-2(x^3+x^2)+84x^2-9 = 3x^3(x+2)+6x^4$
- $7x^4-3x^2(2x^2+2x)+6x^3+6 = 2(3x^2+1)-x^2$
- $3x^2(x^2+3x)-8x^3-9 = 6x^4-x^3(2x-1)-10x^2$
- $x^3(x+1)^2+2x^5-9x^4-x^3-4 = 3x^4(x-1)-17x^2$
- $9-x^2(3x^2-3x)-3x^2(x^2-1)-3x^3 = 13x^2-7x^4$
- $x^2(2x^2-x)-3x^4+12x^2-9 = 2(x^2-3x)-x^3+6x$
- $3x^3-x^3(x+3)-2(2x^2-3x)-6x-9 = 8x^4-86x^2$
- $2(2x^5-3x^4)-3x^5-9 = x^2(x^3-x^2)+4x^4-82x^2$

2. Resuelve la ecuación:

- $7x^2-2x^4-x^3 = 16-x(2x^2+x)-x^3(x-1)$
- $2x(x-1)+2(3x-3)+16x^4-10x^2 = 4x-7$
- $x^4-3x^2(x-1)-x^2(2x-2)+16 = 13x^2-5x^3$
- $3x^3-3(x-1)-4x^2-4 = 3x(x^2-2x)+x^4-3x$
- $1-2x^3-18x^2-2x^3(x+2) = 3x^3(3x-2)-92x^4$
- $5x^4-3(x^2+3x)+6x^3-1 = 2x^3(3x+3)-5x^2-9x$
- $3x^3(x-2)+7x^3-289x^2+81 = x(x^2-x)-253x^4$
- $2x^4-x^2(x^2-3x)-3x^3+9x+81 = 21x^2-3x(x-3)$
- $3x^3-262x^4+288x^2 = 81-3x^3(x-2)-3x^3(x+1)$
- $81-3x(3x^3-2x^2)-2x^2(2x^2+3x) = 18x^2-14x^4$
- $3x(2x-3)+3x^3(3x-3)-25x^4+9x^3+2x^2 = 1-9x$
- $3x(x^3+3x^2)+80x^4-7x^3+16 = x^3(2x+2)+72x^2$

3. Resuelve la ecuación:

- $x^3-2(x^2-2)-6x^2-3 = x^2(2x^2+x)+7x^4$
- $3x(2x+2)-16x^4+24x^2 = 8x-2(x^2+x)-9$
- $x^3(2x+3)-2(2x+2)+2x^4+4 = 3x^3-x^2-4x$
- $16-5x^3-3x^4 = x^3(2x-3)+2x^3(2x-1)-7x^2$
- $3x(x+3)-2x^2(x-2)+4x^4+2x^3 = 4x^2+9x+1$
- $2(x^2-x)+5x^4+6x^3-9 = 2x^3(2x+3)+10x^2-2x$

4. Resuelve la ecuación:

- $2x(x^3-1)-3x^4-5 = 2x^2-2(x+2)$
- $3-81x^4-16x^2-x(2x-3) = 7x-2(2x-2)$
- $2x^2(3x-2)+36x^2+256 = 8x^3-x(x^3+2x^2)$
- $6x^5-2x^4(x-1)-5x^4 = 2x^4(2x-1)+18x^2+81$
- $7x^4-3x^3(2x-2)-6x^3+1 = 2x(x+1)-4x^2-2x$

[4 sol.]

- $2x^2(x^2+1)-x^4-12x^2+15 = 2(2x+3)-4x$
- $2x^3(x-3)+7x^3+10x^2-4 = x^2(x-3)+11x^4$
- $17x^2-2x^3(2x+3)-4 = 4x-4x^3-2(x^3+2x)$
- $x^2(x^2+3)+7x^4-9 = 3x^3(3x-3)+9x^3-7x^2$
- $x(3x-1)-3x^3(x^2+3x)+3x^5+x = 64-145x^2$
- $x(x^3-3x)-x^3(3x-3)+11x^4-3x^3 = 37x^2-16$
- $60x^2-13x^4-4x^3-3x(x^3-x) = 4-2x(2x^2+x)$
- $2x(x+3)-6x^3-7x^2-6x = 5x^4-3x^3(2x+2)-4$
- $11x^3-x^4-3(3x^3+x)+11x^2+3x = 2x^2(x+3)+4$
- $2(x^3-2x^2)-3x(x-2)-4x^4-2x^3-6x = 4-24x^2$
- $3x^3(3x+2)-10x^4-6x^3+6x = 4-x^2-2x(2x-3)$
- $3x^2(x-1)+5x^4+3x^3 = 2x(3x^3+3x^2)-13x^2+9$

[2 sol. A]

- $2(x^4+x^3)-x^2(2x-2)-18x^4 = 81-70x^2$
- $2x^3(x+2)-7x^3+32x^2 = x^3(3x-3)+256$
- $80x^4-x^4(2x+3)+16 = 72x^2-2(x^5+2x^4)$
- $3x^4-2x^2(2x-2)-6x^2+1 = x^3(2x+2)-6x^3$
- $2x^3(x+2)-2x^2(2x-2)+256 = 292x^2-79x^4$
- $x^2(3x-2)-3x(3x^2+2x)-81x^4+6x^3+26x^2 = 1$
- $6x^4-2x^3(2x+1)+8x^3+32x^2-256 = 3x^3(x+2)$
- $2x^3(2x-1)-20x^4+5x^3+81x^2-81 = 3(x^3+3x^2)$
- $7x^4-3(2x^4-x^3)-3x(2x+3)-2x^2 = 3x^3-9x-16$
- $3(2x^2-1)-3(3x^4+2x^3)+2 = 247x^4-6x^3-26x^2$
- $34x^2-x^2(x+2)-2x^2(3x^2+2x) = 250x^4-5x^3+1$
- $x(3x+3)-x^3(x-3)+82x^4-3x^3-3x+256 = 291x^2$

[2 sol. B]

- $x^2-2(x^3+2x^2)-3x(x^3-x^2)+4 = x^3-2x^4$
- $x^2(2x-1)-5x^3+9 = 19x^4-3x^3(x+1)+6x^2$
- $3x^3(x-3)+3x^2(2x+2)-2x^4-4 = 9x^2-3x^3$
- $x^3(3x+2)+2x^3+15x^2+16 = 6x^4-2x^3(x-2)$
- $3(2x^3-2x^2)-x^3(2x+3)+11x^4+11x^2-4 = 3x^3$
- $x(x+3)+13x^4+3x^3+14x^2-3x = 1-x^2(3x^2-3x)$

[Sin sol. A]

- $x(3x+3)-3x-22 = 3(x^2-2)+x^4+8x^2$
- $5x^3-8x^2-1 = 21x^4-2(x^4-3x^3)-x^3(3x+1)$
- $x^2(2x^2+3x)+81x^4+1 = x(2x^3+3x^2)-18x^2$
- $2x^3-x(x^2-1)+33x^2+1 = x^2(x+1)-256x^4+x$
- $2x^2(2x^2-x)+3(x^3+2x^2)-3x^4+16 = x^3-2x^2$

$$11. x^4(x+3)+8x^5+87x^4+16 = 3x^4(3x+3)-72x^2$$

$$12. x^2(2x+2)-6x^3-81 = 2x^3(3x-2)+10x^4+74x^2$$

5. Resuelve la ecuación:

[Sin sol. B]

$$1. 3x^3(x+1)-4x^4-65x^2-16 = x(3x^3+3x^2)$$

$$2. 3(x^4+x^3)-7x^4-6x^3-7x^2 = 1-x(3x^2+2x)$$

$$3. x^4(2x-3)-4x^5+5x^4-10x^2 = 9-x^4(2x-3)$$

$$4. 3x^3(x+2)-3x^3-20x^2 = 3x^2(x-1)+7x^4+4$$

$$5. 2x^3(2x-2)+x(x-1)-5x^4-18x^2+x = 16-4x^3$$

$$6. 2x^2(2x-1)-14x^2-1 = 9x^4-3(x^3+2x^2)+7x^3$$

$$7. 3x^4-3x^3(x+1)-x^3(x+2)+5x^3-13x^2-36 = 0$$

$$8. 3x^2(2x+2)-2(2x-1)+9x^4+7x^2+4x = 6x^3-2$$

$$9. 6x^3-9x^4-22x^2-16 = 3x^2(x+2)+x(3x^2-3x)$$

$$10. 7x^4-3x^3(x+1)+51x^2+81 = 3x^3-3x(2x^2-2x)$$

$$11. x^3(3x+1)+5x^3+153x^2+81 = 2x^3(x+3)-15x^4$$

$$12. x^5-3(x^5-2x^4)-11x^4 = 40x^2-2x^3(x^2-2x)+16$$

6. Resuelve la ecuación:

[4 sol.]

$$1. x^4 - \frac{x^3(x-3)}{3} - \frac{5x^2-1}{6} = x^3$$

$$2. \frac{10x^2}{3} - \frac{x^4+1}{6} = x^4 - \frac{5x^4-14}{12}$$

$$3. x^3 - \frac{3x^4+1}{18} = \frac{x^3(x+3)}{3} - \frac{5}{9}x^2$$

$$4. \frac{5}{3}x^2 - \frac{x^3(x-3)}{9} - \frac{x^3(x+9)}{27} = 3$$

$$5. \frac{x^2(x^2+3)}{4} - \frac{97x^2+7}{16} = -2x^4-1$$

$$6. \frac{89x^2}{16} - \frac{x^2(2x^2+3)}{2} - \frac{x^4}{4} + x^4 = 1$$

$$7. x^4 - \frac{3x^3(x+1)}{2} = 2 - \frac{x^2(27x+85)}{18}$$

$$8. x^4 - \frac{3x^2(x^2+1)}{10} - \frac{2(x^2-9)}{15} = \frac{2x^4}{3}$$

$$9. x^3 - \frac{x^3(2x+3)}{3} = 12 - \frac{x^2(7x^2+25)}{12}$$

$$10. 3x^4 - \frac{17}{4}x^2 - \frac{2x^4+7}{8} = \frac{3}{4}x^2(x^2+1)-2$$

$$11. \frac{9}{10}x^2 - x^4 = 1 - \frac{3x^4+13}{15} - \frac{x^2(3x^2+2)}{6}$$

$$12. \frac{x^3-x^2}{5} \left( x - \frac{x-1}{2} \right) - \frac{13x^4-9}{20} = -x^4+4x^2$$

$$13. \frac{1}{2} - \frac{x^3(x+3)}{3} - \frac{x^2(2x^2-37)}{6} = -x^3+2$$

$$14. \frac{17x^2}{18} - x^3 \left( \frac{x-2}{2} - \frac{2x-3}{3} \right) - \frac{2x^4-1}{9} = 1$$

$$15. \frac{x^2(x^2+1)}{6} - \frac{x^3(2x-3)}{10} = x^3 - \frac{21x^3-4}{30}$$

$$16. \frac{x^3(2x-1)}{3} - \frac{x^3(8x-5)}{15} = x^2 - \frac{17x^2+9}{30}$$

$$17. \frac{x(3x^3+2)}{4} - \frac{x^2(11x^2-3)}{20} - \frac{5x-2}{10} = x^2$$

$$18. \frac{x^2(x^2+15)}{8} - \frac{x^3(1+x)}{2} - \frac{1-3x^3}{6} = 3x^4$$

$$19. 4x^4 - \frac{13x^2}{3} - \frac{2x^4+5}{6} = \frac{x^2(2x^2-3)}{2} - 1$$

$$20. \frac{x^3(1-3x)}{3} - x^2 = \frac{2x^3-3}{6} - \frac{x^2(19x^2+8)}{18}$$

$$21. 2x^4 + \frac{x^3(x+2)}{4} - \frac{x^2(9x^2+25)}{20} = \frac{5x^3-2}{10}$$

$$22. \frac{2x^3+1}{4} - \frac{x^3(3x+1)}{2} = x^2 - \frac{3}{16}x^2(11x^2+1)$$

$$23. \frac{x^3(1-x)}{2} - \frac{x^2(8x+7)}{16} = \frac{3}{4}(x^4+3)-x^3-2x^2$$

$$24. x^2 - \frac{3x^3(x+1)}{8} - \frac{11x^2-23}{24} = \frac{3}{8}x^3(3x-1)+1$$

7. Resuelve la ecuación:

[2 sol. A]

$$1. \frac{x^3(x+2)}{2} - x^3 = 6x^2 - \frac{10x^4+81}{12}$$

$$2. \frac{x^2(3x^2-1)}{2} - \frac{7x^2-1}{10} = \frac{7}{5}x^4 - x^2$$

$$3. 4x^4 - \frac{x^3(x+1)}{2} - \frac{9x^3-16}{18} = 4x^2$$

$$4. x^2 - \frac{3}{16}(2x^2-5) - \frac{x^2(8x^2+1)}{8} = 1$$

$$5. \frac{x}{3} + \frac{x(2x^3-3)}{9} - \frac{x^2(7x^2-18)}{27} = 3$$

$$6. \frac{x^3(3x+1)}{4} - \frac{2x^3-1}{8} = 4x^2 - \frac{125}{4}x^4$$

$$7. \frac{x^3(x+1)}{2} - \frac{x^3(85x+4)}{8} = -36x^2+32$$

$$8. x^2 - \frac{x^3(2x-1)}{4} - \frac{8x^2+1}{16} = \frac{x^3(2x+1)}{4}$$

$$9. x^3 \left( x - \frac{x+3}{3} \right) - \frac{x^2(17x^2-8)}{24} + x^3 = \frac{2}{3}$$

$$10. 3x^4 - \frac{x^2(x^2+3)}{5} - \frac{3x^3-1}{30} = \frac{x^3(x-1)}{10}$$

$$11. \frac{x^3(3x+2)}{2} - \frac{2x^2-1}{6} - 2x^4 = x^3 - \frac{2}{3}x^4$$

$$12. x^4 - \frac{x^3(x-1)}{6} - \frac{x^3(9x+2)}{12} = \frac{8}{3}(x^2-8)$$

$$13. 12x^2 - \frac{x^3(125x+6)}{12} - \frac{x^3(x-2)}{4} = \frac{27}{8}$$

$$14. x^4 - x^3 \left( x - \frac{x+2}{2} \right) - \frac{13}{24}x^4 = x^3 - \frac{2x^2-1}{24}$$

$$15. \frac{x^3(x+2)}{2} + \frac{3x^4}{5} - \frac{9(2x^2-9)}{10} = x^4+x^3$$

$$16. x^3 - \frac{x^3(x+3)}{10} = \frac{2}{5}(x^2-2) - \frac{x^3(3x-14)}{20}$$

$$17. \frac{x^3-3}{2} \left( \frac{x+3}{3} - x-1 \right) - 6x^2 = x - \frac{20x^4+81}{12}$$

$$18. \frac{32x^2}{3} - \frac{2x^3(x+1)}{9} - \frac{2x^3(125x-3)}{27} = 3$$

$$19. \frac{18x^2+1}{5} - \frac{3x^3(x-1)}{10} - \frac{3x^3(29x-2)}{20} = 1$$

$$20. x^4 - \frac{x^3(8x-9)}{12} - \frac{x^3(x-1)}{4} = \frac{8}{3}(x^2-8)+x^3$$

$$21. 2x^4 - \frac{x^2(9x+8)}{12} - \frac{x^3(x-3)}{4} + 1 = \frac{5x^4+11}{12}$$

$$22. 2x^3 \left( x - \frac{x-2}{2} \right) - \frac{x^2(18-61x^2)}{20} = 2x^3 - \frac{1}{20} \quad 23. \frac{1}{3} + \frac{x^3(2x+3)}{6} - \frac{x^3(89x+12)}{24} = 11-12x^2 \quad 24. \frac{x^3}{2} \left( x - \frac{3x+1}{2} \right) - \frac{3x^4}{4} = 2x^2 - 17x^4 - \frac{4x^3+1}{16}$$

8. Resuelve la ecuación:

[2 sol. B]

$$\begin{array}{lll} 1. \frac{x^3(3x+1)}{5} - \frac{x^2(2x-5)}{10} = x^4 - \frac{9}{10} & 2. x^2 - \frac{3(x^4-3)}{20} + \frac{x^2(x^2+2)}{10} = \frac{4}{5}x^2 & 3. x^4 - \frac{9x^4+1}{30} - \frac{x^3(x-3)}{6} = \frac{x^2(x-1)}{2} \\ 4. 4x^2 - \frac{25}{4}x^4 - \frac{3x^2-4}{12} = \frac{x^2(x^2+3)}{2} & 5. 2x^3 \left( \frac{x}{2} - x+2 \right) - 4x^3 = 2x^2 - \frac{x^4+64}{10} & 6. 2 - \frac{x^2(2x^2+5)}{6} - x^3 - \frac{x^3(x-3)}{3} = \frac{1}{2} \\ 7. \frac{x^3(2x+3)}{3} - \frac{31}{6}x^4 - \frac{27x^2-4}{18} = x^3 & 8. x^3 \left( \frac{3x}{2} - x-1 \right) - \frac{9}{10} + x^3 = \frac{2}{5}x^2(x^2-2) & 9. \frac{x^3(x-2)}{4} - \frac{5x^2-7}{8} = -x^2+1 - \frac{x^3(x+2)}{4} \\ 10. \frac{x^3(x-1)}{2} - \frac{27(4x^2-3)}{8} = 9x^4 - \frac{x^3(x+1)}{2} & 11. \frac{x^3(3-4x)}{12} - x^2 = 1 - \frac{x^3(3x-2)}{8} - \frac{9x^2+8}{24} & 12. \frac{x^3(3-2x)}{6} - x^2 = 2 - \frac{17x^2+12}{24} - \frac{x^3(x-1)}{2} \end{array}$$

9. Resuelve la ecuación:

[Sin sol. A]

$$\begin{array}{lll} 1. \frac{x^4+x^3}{6} = x^4 - \frac{4x^4-1}{24} - \frac{x^3+2x^2}{6} & 2. \frac{x^3(3x+2)}{8} - \frac{9}{2}x^2 - \frac{x^3(87x+4)}{16} = 1 & 3. x^2 - \frac{28x^2-1}{30} + \frac{x^3(x+2)}{10} = \frac{x^3(x+3)}{15} \\ 4. \frac{2x^3(x-1)}{3} - \frac{4x^3+81}{6} = -42x^4 - 48x^2 & 5. \frac{x^4}{3} + x^3 \left( \frac{3x}{2} - 2x+3 \right) - \frac{4}{3}(x^2+2) = 3x^3 & 6. 4x^2 - \frac{4x^3-1}{8} - \frac{x^3(3x-1)}{2} = \frac{x^4}{2} - 34x^4 \\ 7. \frac{1}{3} - \frac{x^3(3x+2)}{12} - \frac{x^3(75x-4)}{24} - 3x^2 = 1 & 8. \frac{x^3(3x+2)}{2} - \frac{2x^2+1}{30} - 2x^4 = x^3 - \frac{7}{15}x^4 & 9. 2x^3 \left( \frac{x-1}{2} - \frac{x-1}{4} \right) - 16 - \frac{x^3(9x-8)}{16} = 2x^2 \\ 10. \frac{x^3(2x+1)}{2} - \frac{x^3(10-61x)}{20} = \frac{1-72x^2}{5} - 13 & 11. x^2 + \frac{x^2(x^2+1)}{5} - \frac{(2x+1)(2x-1)}{10} = -\frac{7}{5}x^4 & 12. \frac{x^3}{2} \left( x - \frac{2x+3}{2} \right) - \frac{32}{3}x^4 = 12x^2 - \frac{3}{8}(2x^3-9) \end{array}$$

10. Resuelve la ecuación:

[Sin sol. B]

$$\begin{array}{lll} 1. \frac{5}{2}x^2+8 - \frac{x^3(x+6)}{8} + \frac{x^3(x+3)}{4} = 0 & 2. x^3 + \frac{x^3(3x-2)}{2} - \frac{x^2(13x^2+20)}{8} = 8 & 3. x^4 - \frac{x^2(2x^2-3)}{2} - \frac{x^2(x^2+29)}{6} = \frac{32}{2} \\ 4. \frac{x^3(2x+3)}{3} - \frac{x^2(13x^2+97)}{4} = x^3+24 & 5. \frac{3x^3-1}{4} - \frac{5}{16}x^2(x^2+1) = x^3 - \frac{x^3(x+1)}{4} & 6. x^3 + \frac{x^3(x-2)}{2} - \frac{x^2(21x^2+265)}{10} = \frac{72}{5} \\ 7. x^2 \left( \frac{3x}{2} - x+3 \right) - \frac{x^2(7x^2-20)}{16} = 3x^3-4 & 8. 1 - \frac{x^3(2x-3)}{5} - \frac{x^2(6x-17)}{10} = \frac{9}{10} - 2x^4 & 9. 2x^3 \left( \frac{x}{2} - \frac{x-3}{6} \right) - \frac{x^2(25x^2+97)}{26} = x^3+6 \\ 10. \frac{x^3(x+1)}{4} - \frac{x^3(19x+3)}{12} - 7x^2 = 3 - \frac{11}{12}x^2 & 11. \frac{4}{9} + \frac{x^3(2x-3)}{3} - \frac{x^2(13x^2+20)}{18} = -x^3+4 & 12. x^3 \left( \frac{3x-2}{2} - 2x+2 \right) - \frac{3}{8} = x^3 - \frac{x^2(2x^2-17)}{6} \end{array}$$

11. Resuelve la ecuación:

[4 sol.]

$$\begin{array}{llll} 1. \frac{15}{x+2} - \frac{15}{x-2} = 9x^2+11 & 2. 6 + \frac{1}{x+2} - \frac{x-17}{x^2-4} = x^2 & 3. 4x^2-13 = \frac{1}{x-1} - \frac{x-8}{x^2-1} & 4. 13 + \frac{1}{x-2} - \frac{x-34}{x^2-4} = x^2 \\ 5. \frac{1}{x-1} - \frac{x+25}{x^2-1} + 12 = x^2 & 6. 9x^2 - \frac{1}{x-1} = 28 - \frac{x-23}{x^2-1} & 7. \frac{1}{x+2} - \frac{x+19}{x^2-4} - 4x^2 = 3 & 8. \frac{28}{3x+9} - \frac{28}{3x-9} = -x^2+8 \\ 9. \frac{1}{x+3} - \frac{x+37}{x^2-9} - x^2-4 = 0 & 10. x^2-2x = 6 - \frac{11}{x} - \frac{x-13}{x^2+2x} & 11. \frac{1}{4x+6} - \frac{2x+17}{8x^2-18} - x^2 = 1 & 12. \frac{1}{2x} - \frac{7}{6x-4} - 12x^2-8x = 1 \\ 13. 16x - \frac{45}{x+1} = \frac{4}{x} - 49+16x^2 & 14. \frac{x+5}{x+1} \left( 2 - \frac{x+3}{x-1} \right) + 4x^2 = 34 & 15. \frac{15}{2x-2} - \frac{15}{2x+2} = -4x^2+21 & 16. x^2+3x - \frac{25}{x-3} = 8 - \frac{x+16}{x^2-3x} \\ 17. \frac{1}{x-1} - \frac{x-14}{x^2-1} - 9x^2+31 = 0 & 18. -4x^2-8x - \frac{5}{x} - \frac{x+19}{x^2-2x} = 3 & 19. \frac{35}{6x+18} - \frac{35}{6x-18} = -x^2+11 & 20. \frac{1}{9x-6} - \frac{3x-13}{27x^2-12} = 3x^2-2 \\ 21. \frac{15}{2x-1} - \frac{18}{x} = -16x^2-8x+21 & 22. 4 - \frac{3x+23}{27x^2-3} + \frac{1}{9x+3} = 3x^2 & 23. 13 + \frac{1}{4x+2} - \frac{2x-19}{8x^2-2} = 16x^2 & 24. 7 + \frac{1}{9x+3} - \frac{3x+14}{27x^2-3} = 12x^2 \end{array}$$

12. Resuelve la ecuación:

[2 sol. A]

$$\begin{array}{lll}
 1. \frac{1}{x+2} - \frac{x+7}{x^2-4} - x^2 = 2 & 2. \frac{1}{x-3} - \frac{x+28}{x^2-9} - x^2 - 1 = 0 & 3. \frac{1}{2x} - \frac{9}{2x-4} - 2x - 2 = x^2 \\
 4. \frac{22}{x+3} - \frac{x+1}{x^2+3x} - x^2 = 7 - 3x & & \\
 5. 15 - \frac{12}{x-1} - \frac{x+27}{x^2+x-2} = x^2 - x & 6. \frac{1}{4x+6} - \frac{2x+47}{8x^2-18} - 1 = 4x^2 & 7. \frac{2}{x} - \frac{x+14}{2x^2+3x} - 4x^2 + 6x = 1 \\
 8. \frac{1}{x+2} \left( 1 - \frac{x^2+x+3}{x-2} \right) - x^2 - 1 = 0 & & \\
 9. \frac{1}{9x+6} - \frac{3x+25}{27x^2-12} - 9x^2 = 2 & 10. \frac{32}{3x+9} - \frac{1}{3} \left( \frac{x+29}{x-3} - 1 \right) - x^2 = 7 & 11. \frac{3}{x+1} - \frac{4x+1}{4x^2+4x} - 4x^2 + 4x = 2 \\
 12. \frac{1}{3} - \frac{3x^2-10x+1}{9x^2+6x} - 9x^2 + 6x = 2 & & 
 \end{array}$$

13. Resuelve la ecuación:

[2 sol. B]

$$\begin{array}{lll}
 1. \frac{1}{x-1} - \frac{x-14}{x^2-1} - x^2 = 1 & 2. 4x^2 - \frac{1}{x-1} = 1 - \frac{x-9}{x^2-1} & 3. \frac{9}{x} - \frac{x-27}{x^2-2x} - 2x + 4 = x^2 \\
 4. \frac{9}{x} - \frac{x+17}{x^2+2x} - x^2 + 2x = 4 & & \\
 5. 2x - \frac{x-5}{x^2+2x+1} - x^2 = \frac{1}{x+1} & 6. \frac{1}{4x+2} - \frac{2x+9}{8x^2-2} - 7 = 18x^2 & 7. \frac{1}{2x-2} - \frac{x+40}{2x^2-2} - 8x^2 = 24 \\
 8. 12 - \frac{9}{x+2} - \frac{x-31}{x^2+x-2} = x^2 - x & & \\
 9. \frac{3}{x} - \frac{x-21}{3x^2+2x} - 9x^2 + 6x = 4 & 10. \frac{1}{4x-2} - \frac{2x+31}{8x^2-2} - 16x^2 = 19 & 11. \frac{1}{9x+6} - \frac{3x+43}{27x^2-12} - 9x^2 = 4 \\
 12. 12 - \frac{49x+10}{4x^2+4x} + \frac{1}{4x} = 4x - 4x^2 & & 
 \end{array}$$

14. Resuelve la ecuación:

[Sol. falsas]

$$\begin{array}{lll}
 1. 16 - \frac{x+16}{x^2-x} - x = x^2 - \frac{17}{x-1} & 2. x^2 + x - \frac{6}{x+1} - \frac{17-x}{x^2-x-2} = 7 & 3. x^2 - \frac{9}{x-2} = 10 - \frac{x+25}{x^2-x-2} - x \\
 4. 7 - \frac{4}{x-4} - \frac{x-32}{x^2-x-12} = x^2 + x & & \\
 5. -2x^2 - x - \frac{x+19}{2x^2-x-6} = \frac{5}{2x+3} & 6. \frac{11}{x-1} - \frac{x+43}{x^2+2x-3} - 2 + 2x = x^2 & 7. 9x^2 + 27x - \frac{4}{x-3} = 1 - \frac{x+9}{x^2-3x} \\
 8. 4 - \frac{1}{x} \left( 2 - \frac{x-2}{x+1} \right) - \frac{3}{x+1} = x^2 - x & & \\
 9. \frac{21}{x+1} - \frac{x+43}{x^2+4x+3} - x^2 + 4x = 8 & 10. 1 + \frac{2}{x-1} - \frac{x+1}{x^2-x} = x^2 + x & 11. x^2 - x - \frac{6}{x-2} = 1 - \frac{x+28}{x^2+x-6} \\
 12. \frac{4}{x-1} - \frac{x+11}{x^2+x-2} - x^2 + x = 1 & & \\
 13. \frac{6}{x-2} - \frac{x+28}{x^2+x-6} + 1 = x^2 - x & 14. x - \frac{2}{x+2} - \frac{x+8}{x^2+x-2} = x^2 - 5 & 15. \frac{4}{3x-3} - \frac{x+3}{3x^2-3x} - x + 1 = x^2 \\
 16. \frac{10}{x-2} - \frac{x+8}{x^2-3x+2} - 3x + 1 = x^2 & & \\
 17. \frac{10}{x+1} - \frac{x+11}{x^2+3x+2} - x^2 + 3x = 5 & 18. 2 - \frac{1}{2x+1} - \frac{x+1}{2x^2+x} = 8x^2 - 4x & 19. \frac{6}{x-1} - \frac{x+17}{x^2+x-2} - x^2 + x = 3 \\
 20. \frac{3}{2x+2} - \frac{x-2}{2x^2+2x} - x^2 + x = 1 & & \\
 21. 1 - 2x - \frac{x-15}{x^2-2x-3} = \frac{3}{x-3} + x^2 & 22. 2 - x^2 - \frac{5}{x+4} - \frac{x-29}{x^2-3x-4} = 3x & 23. 3 - \frac{4}{x-2} - \frac{x-14}{x^2-x-2} = 4x^2 + 4x \\
 24. \frac{7}{2x+6} - \frac{x-18}{2x^2+6x} - x^2 + 3x = 1 & & 
 \end{array}$$

15. Resuelve la ecuación:

[Sin sol. A]

$$\begin{array}{lll}
 1. \frac{2}{x+1} - \frac{2}{x-1} - x^2 = 3 & 2. \frac{4}{x+1} - \frac{1}{x} - x^2 + x = 3 & 3. \frac{1}{x+1} - \frac{x+3}{x^2-1} - x^2 - 3 = 0 \\
 4. \frac{25}{2x+2} - \frac{25}{2x-2} - x^2 = 9 & & \\
 5. \frac{1}{4x-4} - \frac{x+17}{4x^2-4} = x^2 + 3 & 6. \frac{1}{x} - \left( \frac{x+3}{x-1} - 1 \right) - x^2 - x = 3 & 7. x^2 + \frac{1}{3x} - \frac{2(5x-1)}{3x^2+3x} = x - 3 \\
 8. \frac{1}{4x-2} - \frac{2x+9}{8x^2-2} - 4x^2 = 3 & & \\
 9. -x^2 - x - \frac{6}{x-2} - \frac{x+5}{x^2-x-2} = 5 & 10. x^2 - x - \frac{1}{x} \left( \frac{x^2+x+25}{x+1} - 9 \right) = 8 & 11. \frac{1}{x+1} - \frac{1}{x+1} \left( 2 - \frac{x-5}{x-1} \right) - x^2 = 3 \\
 12. \frac{7}{2x} - \frac{2x+9}{4x^2+2x} - 8x^2 + 4x = 6 & & 
 \end{array}$$

16. Resuelve la ecuación:

[Sin sol. B]

$$\begin{array}{lll}
 1. \frac{10}{x+2} - \frac{10}{x-2} = x^2 + 9 & 2. \frac{9}{x} - \frac{20}{x+1} + 11 = -x^2 + x & 3. \frac{1}{x+1} - \frac{x+19}{x^2-1} - x^2 = 11 \\
 4. \frac{1}{x-2} - \frac{x+42}{x^2-4} - x^2 = 9 & & \\
 5. -x^2 - x - \frac{17}{x-1} - \frac{x+16}{x^2-x} = 18 & 6. \frac{11}{x-1} - \frac{x+42}{x^2+x-2} - x^2 + x = 8 & 7. \frac{16}{x+2} - \frac{x+19}{x^2+x-2} - x^2 + x = 13 \\
 8. \frac{1}{x-1} - \frac{5(5x-1)}{x^2-2x+1} - x^2 - 2x = 13 & & 
 \end{array}$$

9.  $\frac{1}{3} - \frac{x^2-40x+11}{3x^2+6x+3} - x^2+2x = 8$     10.  $-2x^2-x - \frac{12}{2x-1} - \frac{x+36}{2x^2-x} = 13$     11.  $\frac{6}{2x-1} - \frac{x+11}{2x^2+x-1} - 2x^2+x = 4$

12.  $\frac{41}{x+3} - \frac{x+19}{x^2+2x-3} - x^2+2x = 17$

— Soluciones —

- 1.1.  $\pm 4, \pm 1$     1.2.  $\pm 3, \pm 1$     1.3.  $\pm 1, \pm \frac{1}{2}$     1.4.  $\pm 1, \pm \frac{2}{3}$     1.5.  $\pm 3, \pm 1$     1.6.  $\pm 2, \pm \frac{1}{2}$     1.7.  $\pm 4, \pm 2$     1.8.  $\pm 3, \pm 1$     1.9.  $\pm 3, \pm \frac{1}{3}$     1.10.  $\pm 4, \pm \frac{2}{3}$     1.11.  $\pm 2, \pm 1$     1.12.  $\pm 2, \pm \frac{2}{3}$
- 1.13.  $\pm 3, \pm 1$     1.14.  $\pm 2, \pm \frac{1}{4}$     1.15.  $\pm 2, \pm \frac{1}{2}$     1.16.  $\pm 2, \pm 1$     1.17.  $\pm 3, \pm 1$     1.18.  $\pm 2, \pm 1$     1.19.  $\pm 3, \pm 1$     1.20.  $\pm 2, \pm \frac{1}{2}$     1.21.  $\pm 3, \pm \frac{1}{3}$     1.22.  $\pm 2, \pm 1$     1.23.  $\pm 3, \pm \frac{1}{3}$     1.24.  $\pm 3, \pm 1$
- 2.1.  $\pm 2$     2.2.  $\pm \frac{3}{2}$     2.3.  $\pm \frac{1}{2}$     2.4.  $\pm 4$     2.5.  $\pm 2$     2.6.  $\pm \frac{2}{3}$     2.7.  $\pm 1$     2.8.  $\pm 1$     2.9.  $\pm \frac{1}{3}$     2.10.  $\pm \frac{4}{3}$     2.11.  $\pm 1$     2.12.  $\pm \frac{1}{3}$     2.13.  $\pm \frac{3}{4}$     2.14.  $\pm 4$     2.15.  $\pm 3$     2.16.  $\pm \frac{3}{2}$
- 2.17.  $\pm \frac{3}{4}$     2.18.  $\pm 2$     2.19.  $\pm 3$     2.20.  $\pm \frac{1}{4}$     2.21.  $\pm \frac{1}{2}$     2.22.  $\pm \frac{1}{4}$     2.23.  $\pm \frac{2}{3}$     2.24.  $\pm \frac{4}{3}$     3.1.  $\pm \frac{1}{3}$     3.2.  $\pm 1$     3.3.  $\pm \frac{3}{2}$     3.4.  $\pm \frac{3}{4}$     3.5. 0    3.6.  $\pm 2$     3.7.  $\pm \frac{4}{3}$     3.8.  $\pm 4$
- 3.9.  $\pm \frac{1}{2}$     3.10.  $\pm \frac{2}{3}$     3.11.  $\pm 3$     3.12.  $\pm \frac{1}{4}$     4.1. s.s.r.    4.2. s.s.r.    4.3. s.s.r.    4.4. s.s.r.    4.5. s.s.r.    4.6. s.s.r.    4.7. s.s.r.    4.8. s.s.r.    4.9. s.s.r.    4.10. s.s.r.
- 4.11. s.s.r.    4.12. s.s.r.    5.1. s.s.r.    5.2. s.s.r.    5.3. s.s.r.    5.4. s.s.r.    5.5. s.s.r.    5.6. s.s.r.    5.7. s.s.r.    5.8. s.s.r.    5.9. s.s.r.    5.10. s.s.r.    5.11. s.s.r.    5.12. s.s.r.
- 6.1.  $\pm 1, \pm \frac{1}{2}$     6.2.  $\pm 2, \pm \frac{2}{3}$     6.3.  $\pm 1, \pm \frac{1}{3}$     6.4.  $\pm 3, \pm \frac{3}{2}$     6.5.  $\pm \frac{3}{2}, \pm \frac{1}{3}$     6.6.  $\pm 4, \pm \frac{1}{2}$     6.7.  $\pm 3, \pm \frac{2}{3}$     6.8.  $\pm 3, \pm 2$     6.9.  $\pm 4, \pm 3$     6.10.  $\pm \frac{3}{2}, \pm \frac{1}{2}$     6.11.  $\pm 2, \pm \frac{1}{3}$     6.12.  $\pm 3, \pm \frac{1}{3}$
- 6.13.  $\pm 3, \pm \frac{1}{2}$     6.14.  $\pm 4, \pm 1$     6.15.  $\pm 2, \pm 1$     6.16.  $\pm \frac{3}{2}, \pm 1$     6.17.  $\pm 2, \pm \frac{1}{2}$     6.18.  $\pm \frac{2}{3}, \pm \frac{1}{3}$     6.19.  $\pm 1, \pm \frac{1}{4}$     6.20.  $\pm 3, \pm 1$     6.21.  $\pm \frac{2}{3}, \pm \frac{1}{2}$     6.22.  $\pm 1, \pm \frac{2}{3}$     6.23.  $\pm 2, \pm \frac{3}{2}$
- 6.24.  $\pm \frac{1}{2}, \pm \frac{1}{3}$     7.1.  $\pm \frac{3}{2}$     7.2.  $\pm 1$     7.3.  $\pm \frac{2}{3}$     7.4.  $\pm \frac{1}{2}$     7.5.  $\pm 3$     7.6.  $\pm \frac{1}{4}$     7.7.  $\pm \frac{4}{3}$     7.8.  $\pm \frac{1}{2}$     7.9.  $\pm 2$     7.10.  $\pm \frac{1}{3}$     7.11.  $\pm 1$     7.12.  $\pm 4$     7.13.  $\pm \frac{3}{4}$     7.14.  $\pm \frac{3}{2}$
- 7.15.  $\pm 3$     7.16.  $\pm 2$     7.17.  $\pm \frac{3}{2}$     7.18.  $\pm \frac{3}{4}$     7.19.  $\pm \frac{2}{3}$     7.20.  $\pm 4$     7.21.  $\pm \frac{1}{2}$     7.22.  $\pm \frac{1}{3}$     7.23.  $\pm \frac{4}{3}$     7.24.  $\pm \frac{1}{4}$     8.1.  $\pm \frac{3}{2}$     8.2.  $\pm 3$     8.3.  $\pm \frac{1}{4}$     8.4.  $\pm \frac{2}{3}$     8.5.  $\pm \frac{4}{3}$     8.6.  $\pm 1$
- 8.7.  $\pm \frac{1}{3}$     8.8.  $\pm 1$     8.9.  $\pm \frac{1}{2}$     8.10.  $\pm \frac{3}{4}$     8.11.  $\pm 4$     8.12.  $\pm 2$     9.1. s.s.r.    9.2. s.s.r.    9.3. s.s.r.    9.4. s.s.r.    9.5. s.s.r.    9.6. s.s.r.    9.7. s.s.r.    9.8. s.s.r.    9.9. s.s.r.
- 9.10. s.s.r.    9.11. s.s.r.    9.12. s.s.r.    10.1. s.s.r.    10.2. s.s.r.    10.3. s.s.r.    10.4. s.s.r.    10.5. s.s.r.    10.6. s.s.r.    10.7. s.s.r.    10.8. s.s.r.    10.9. s.s.r.    10.10. s.s.r.    10.11. s.s.r.    10.12. s.s.r.
- 11.1.  $\pm \frac{4}{3}, \pm 1$     11.2.  $\pm 3, \pm 1$     11.3.  $\pm 2, \pm \frac{1}{2}$     11.4.  $\pm 4, \pm 1$     11.5.  $\pm 3, \pm 2$     11.6.  $\pm 2, \pm \frac{1}{3}$     11.7.  $\pm \frac{3}{2}, \pm 1$     11.8.  $\pm 4, \pm 1$     11.9.  $\pm 2, \pm 1$
- 11.10.  $\pm 3, \pm 1$     11.11.  $\pm 1, \pm \frac{1}{2}$     11.12.  $\pm \frac{1}{2}, \pm \frac{1}{3}$     11.13.  $\pm 2, \pm \frac{1}{4}$     11.14.  $\pm 3, \pm \frac{1}{2}$     11.15.  $\pm 2, \pm \frac{3}{2}$     11.16.  $\pm 4, \pm 1$     11.17.  $\pm 2, \pm \frac{2}{3}$     11.18.  $\pm \frac{3}{2}, \pm 1$     11.19.  $\pm 4, \pm 2$
- 11.20.  $\pm 1, \pm \frac{1}{3}$     11.21.  $\pm 1, \pm \frac{3}{4}$     11.22.  $\pm 1, \pm \frac{2}{3}$     11.23.  $\pm 1, \pm \frac{1}{4}$     11.24.  $\pm \frac{2}{3}, \pm \frac{1}{2}$     12.1.  $\pm 1$     12.2.  $\pm 2$     12.3.  $\pm 1$     12.4.  $\pm 1$     12.5.  $\pm 3$     12.6.  $\pm 1$     12.7.  $\pm 1$     12.8.  $\pm 2$
- 12.9.  $\pm \frac{1}{3}$     12.10.  $\pm 3$     12.11.  $\pm \frac{1}{2}$     12.12.  $\pm \frac{1}{3}$     13.1.  $\pm 2$     13.2.  $\pm \frac{3}{2}$     13.3.  $\pm 3$     13.4.  $\pm 1$     13.5.  $\pm 2$     13.6.  $\pm \frac{1}{3}$     13.7.  $\pm \frac{1}{2}$     13.8.  $\pm 4$     13.9.  $\pm 1$     13.10.  $\pm \frac{1}{4}$     13.11.  $\pm \frac{1}{3}$
- 13.12.  $\pm \frac{1}{2}$     14.1. -4, -1, 4    14.2. -3, 1, 3    14.3. -3, -2, 3    14.4. -4, -2, 2    14.5. -1, 1,  $\frac{3}{2}$     14.6. -2, -1, 2    14.8. -2, 1, 2    14.9. -2, 1, 2    14.10. -1    14.11. -2
- 14.12. -1    14.13. -2    14.14. 2    14.15. -1    14.16. -2    14.17. 1    14.18.  $\frac{1}{2}$     14.19. -1    14.20. 1    14.21. -3    14.22. -4    14.23. -2    14.24. 3    15.1. s.s.r.    15.2. s.s.r.
- 15.3. s.s.r.    15.4. s.s.r.    15.5. s.s.r.    15.6. s.s.r.    15.7. s.s.r.    15.8. s.s.r.    15.9. s.s.r.    15.10. s.s.r.    15.11. s.s.r.    15.12. s.s.r.    16.1. s.s.r.    16.2. s.s.r.    16.3. s.s.r.    16.4. s.s.r.    16.5. s.s.r.    16.6. s.s.r.    16.7. s.s.r.    16.8. s.s.r.    16.9. s.s.r.    16.10. s.s.r.    16.11. s.s.r.    16.12. s.s.r.