

1. Resuelve la ecuación:

[$ax^2+c=0$]

- $12x-4x^2-3(x+1)+6 = 3(3x-2)$
- $9x-x(3x+3)-2(3x-2) = 5-7x^2$
- $5-3x(x-3)-2(2x+2) = 6x^2+5x$
- $3(x^2-2)-3(2x-1)+13x^2 = 6-6x$
- $5x-2(x^2+2x)-1 = x(2x+1)-5x^2$
- $3(2x+2)+3x(2x-1)-5 = 7x^2+3x$
- $2(3x+3)-3x+3 = 3(3x^2+x)-8x^2$
- $8x-6x^2-x(2x-1) = 1-3(3x^2-3x)$
- $12x^2-4x-1 = 2x(3x-1)-x(3x+2)$
- $2x(x+2)+3(2x+2)-11x^2-5 = 10x$
- $3x(x-2)-2x(x+3)+12x+4 = 10x^2$
- $2x(3x-3)+8x+13 = 2(x+2)+10x^2$
- $3(3x^2+3x)-2x(x+3)-3x = 6x^2+1$
- $5x^2+12x+9 = 3(x^2+3x)+3(x^2+x)$
- $17x-20x^2-4 = x(3x-1)-3(3x-1)^2$
- $3x(x+3)-3x(2x-1)+19x^2-1 = 12x$
- $x^2(2x-1)+7x^2-1 = 4x^3-2x(x^2-x)$
- $3(3x^2+x)-3(x^2-3x)-10x^2+1 = 12x$
- $2x^2(3x-1)+x^2(2x-3)-8x^3 = 4x^2-1$
- $16x^2-3x(3x-3)-12x = 3x(2x-1)+9$
- $10x^2-3(2x-2)-3x(3x+2) = 22-12x$
- $3(2x^3+x^2)-2(x^3-2x^2)-4x^3-3x^2 = 1$
- $10x^2-2(3x+3)+15x = 3(3x^2+3x)+10$
- $3x^2(3x+3)-18x^3+1 = 4x^2-3x^2(3x-2)$

2. Resuelve la ecuación:

[$ax^2+bx=0$]

- $4x^2-3(x+1)-3x(x-3) = 7x-3$
- $9x^2-3x(3x-2)-10x = x(x-1)$
- $4x^2-x(2x-1)-6x = 2x(2x-2)$
- $5x^2-3x = 3(2x^2-x)+x(2x-1)$
- $3(3x+3)-x(3x+3)-x^2-3x = 9$
- $6x-2x(3x+1) = x(2x+2)-7x^2$
- $2x(2x-3)+x(3x-2) = 8x^2-4x$
- $2x(3x+3)-2(2x-1)-2 = 5x^2+x$
- $2x(3x-1)-2x^2 = 3(2x^2-x)+2x$
- $3x-10x^2 = 2x(x-2)-3x(3x-3)$
- $2x(2x+2)-2(3x-2)-2x^2+x = 4$
- $6x^2-3(x+2)+6 = 3(x^2+2x)-7x$
- $9x-3(2x^2+3x) = 3x(x+1)-8x^2$
- $9x^2-3(3x-1)-2(3x^2-x) = 3-9x$
- $2x(3x+1)-3(2x-2)-5x^2 = 6-3x$
- $3(2x+2)-5x-2 = 7x^2-2(2x^2-2)$
- $2(3x-1)+3x^2+2 = 3x(2x+3)-2x$
- $3(2x+3)+x-9 = 2(3x^2+3x)-7x^2$
- $3x(3x-3)+14x = 3x(2x+1)+6x^2$
- $3(3x^2-2x)-21x^2 = 7x-3x(3x+3)$
- $6x-3(3x^2+3)+9 = 3x(2x+1)-13x^2$
- $2x^2(3x+3)-2x(3x+3)-x^2 = 6x^3-5x$
- $3x^2(3x+3)-2x^2(x+3)-7x^3+4x = 6x^2$
- $2x(x^2-2x)-2x^3-4x^2 = 11x-3(3x^2+3x)$

3. Resuelve la ecuación:

[Dos sol.]

- $7x^2-2x(x+1)+1 = 3x(x+2)-5x$
- $x(x-2)+14x+2 = 3(3x+1)-3x^2$
- $2x^2-8x-7 = 2x(2x-1)-3(x+3)$
- $3x(x-2)-2x(3x-3)-2 = x-4x^2$
- $13x^2-x(x-2)-2x(3x+3) = x+6$
- $3x^2-3x(x-2)+2x = 3x(x+3)-2$
- $2x^2-2(2x-3)-2(x-2) = 13-11x$
- $3x(x+2)-2(x^2-3x)-11x = 1-x^2$
- $2x(3x-2)-6x^2-x = 1-3(2x^2-1)$
- $21x-3(x+1)-3x(2x+3) = 1-4x^2$
- $2x^2-3x-11 = 3x(x-3)+3(3x-3)$
- $2(2x^2+x)-3(2x^2-3x)-8x-1 = 0$
- $4x^2-3(3x-2)+4x = 12-3(2x+1)$
- $3(2x+1)-3(x^2+3x)+6x^2 = 5-4x$
- $3(3x-2)-10x = 8x^2-3(2x^2-2x)$
- $2(3x^2-3x)-3(3x-2)+14x = 8x^2$
- $x(2x-2)+3(3x^2+x)-9x^2 = 4-6x$
- $2x(2x+2)-2(2x-2)+7x-2 = 8x^2$
- $6x^2-2(2x+1)-18x = 13-2(x+3)^2$
- $3(x^2+x)-3x(3x-2)-14x = 1-2x^2$
- $x(3x+2)-3x(x+1)+3x^2 = 12x-12$
- $2(2x+3)-3x^2-10 = 2x-2x(3x-3)$
- $13x-2x(3x+3)+3 = 2(2x+1)-8x^2$
- $3x^2(x-1)-3x^2(x-2)-7x^2 = 6-11x$
- $3x(2x-2)+3(x^2-2x)-3x^2+7x = 4$
- $1-3x-3x(3x+1) = 3(x^2-x)-17x^2$
- $2x^2+9x+13 = 2x(2x-2)+3(2x+3)$
- $18x^2-3x(3x-1)-9x = 2x(3x-2)+1$
- $2x(3x-3)+11x+10 = 4x^2-2(3x+1)$
- $2x(2x-3)-3(x^2+3x)-3x^2 = 1-12x$
- $4x^2-3x(2x+2)+17x = 3(2x+1)-15$
- $3x(3x-3)-2(2x^2-2x)-2 = x^2-12x$
- $2x(2x-3)-3(2x^2-1)+14 = 3(2x-3)-2x^2-12x+12 = 2x(3x-2)$
- $2x^2(2x-3)+x+3 = 2(2x^3-x^2)-2x^2$
- $3(3x+2)+3(3x^2-3x)-17x = 5x^2+2$
- $14x^2-3(3x^2+x)-4x = 2(3x^2-1)+14$
- $2(3x^2-3x)-3(x-3)+16x = 8x^2+10$
- $3(3x+3)-2(2x^2-2x)+2x^2 = 10x+10$
- $39(3x^2-x)-13x^2+12 = 2x-3(2x^2-2x)$
- $3x^2(2x+2)-2x^2(3x-2)+7x+3 = 16x^2$
- $41(2x^2+2)+2x^3+16 = 3x(2x^2+x)-4$
- $3(3x^3+x)+15x^2+8 = 3(3x^3+2x^2)-15x$

4. Resuelve la ecuación:

[Sol. doble]

- $2x(2x+3)-6x^2-1 = 6x-x(x-2)$
- $x(x+2)-2x(2x-2)-1 = 4x-2x^2$
- $2-2(x-1)-5x^2 = 8x-2x(3x+3)$
- $2(2x-2)+7x+3 = x(x+3)+15x^2$
- $2x(2x+3)+3x^2+x+1 = x(3x+3)$
- $2(3x^2+x)-3(x-1)-10x^2-4 = 3x$
- $3(2x+3)+3x^2+4x+7 = x(2x+2)$
- $2x(x-1)+2x^2+16 = 3x(x+3)-3x$
- $2(2x^2+3)-7x^2-15 = x(x+1)+11x$
- $5x^2+10x+1 = -x(x+2)-3(x^2-2x)$
- $x^2(x-1)-2(2x^2+3x)-9 = x^3-4x^2$
- $16x^2-3x(3x+1)+1 = 3(x^2-x)+4x$
- $7x^2-2(2x+1)+2x = 2x(3x+2)-11$
- $8x^2-8x-16 = 3(2x^2-x)+3(x^2+x)$
- $7x^2-2(2x^2+3x)+4 = x(2x-1)-9x$

16. $2x(x-3)+2x-16 = 2x(3x+2)-3x^2$
 19. $2x(2x-2)-2(2x^2+x)-9x^2+12x = 1$
 22. $2x(x-3)-12x^2+11x = 16-3x(3x+1)$

17. $5x^2-2(3x+3)+4x = 2(3x^2-2x)-5$
 20. $2x(3x-1)+7x^2+9 = 3x(3x+1)-17x$
 23. $14x^2-22x+9 = 2(2x^2-x)-2(3x^2-2x)$

18. $3(2x+3)+2x(2x+3)-5x^2-25 = 4x$
 21. $17x^2-2x(2x-2)-5 = 3(3x^2-2)+8x$
 24. $13x^2-2(3x^2+3x)+12x = 2(3x^2+2x)-1$

5. Resuelve la ecuación:

[Sin sol. $ax^2+c=0$]

1. $2x^2-3x(x-3)-18x-1 = 3x(x-3)$
 4. $2x(x-2)+2x-1 = 2x(3x-1)+5x^2$
 7. $7x^2-8x-9 = 3(3x^2-2x)-x(x+2)$
 10. $8x^2+15x-4 = 3x(x+3)+2x(3x+3)$

2. $2(3x-1)-4x^2+1 = 12x-3x(x+2)$
 5. $2x^2(3x+1)-3x^2(2x+3) = 1-3x^2$
 8. $12x-10x^2+2 = 3(x+1)-3x(3x-3)$
 11. $x^2(2x+1)-3x^2-1 = 4x^3-2x(x^2-x)$

3. $3x(2x-1)-3x^2+4x = x(2x+1)-4$
 6. $7x^2-8x+1 = 2x(3x-3)-x(3x+2)$
 9. $5x^2-x(2x+2)-2x+16 = 2(x^2-2x)$
 12. $6x^3-3(x^3-2x^2)-3x^2(x+3)-x^2 = 1$

6. Resuelve la ecuación:

[Sin sol.]

1. $x(3x-2)+x^2-8x+25 = x(3x-2)$
 4. $2(3x^2-x)-3x(x-2)-4x^2-6x = 5$
 7. $2x(3x+1)+3x(x-3)-2 = 10x^2-9x$
 10. $5x^2-3(2x^2+3x)+2x = 1-3(3x-3)$

2. $3(2x+3)-4x^2-2x = 11-3x(x-2)$
 5. $4x^2-x(3x-3)-17 = 2(x^2+2x)+x$
 8. $x^2(3x-2)-x^2(x-1)+6x = 2x^3+25$
 11. $5-5x^2-12x = x(3x-1)-3(3x^2+3x)$

3. $3x(2x-1)-x(2x+3)-3x^2+13 = 0$
 6. $2x^2+12x+10 = 3x(x+3)-x(2x-1)$
 9. $2(x^2-2x)+2(3x-3)+6x-19 = 3x^2$
 12. $2(x^2+x)+8x^2-16x = 3x(3x-2)-17$

7. Resuelve la ecuación:

[$ax^2+c=0$]

1. $\frac{x(2x-3)}{5} + \frac{3}{10}(2x+3) = 2x^2$
 4. $\frac{3}{4}x + \frac{x(x-1)}{4} - \frac{3}{10}(x^2+3) = x$
 7. $\frac{5}{8}x^2 - \frac{x(2x+3)}{4} - \frac{2x-7}{8} + x = 1$
 10. $\frac{23}{27} - \frac{x(x+2)}{9} + \frac{2}{27}x(2x+3) = 1$
 13. $\frac{18x+23}{24} - \frac{x(x-1)}{4} + \frac{11}{12}x^2 - x = 1$
 16. $\frac{5}{24}x^2 - \frac{x(x+1)}{4} + x+1 = \frac{18x+23}{24}$
 19. $\frac{x}{2} - \frac{2}{15}(2x+1)(2x-1) = x - \frac{x(x+1)}{2}$
 22. $\frac{x(3x-1)}{3} - \frac{2}{27}(9x+13)+1 = \frac{4}{3}x^2 - x$

2. $x - \frac{x(x+2)}{4} - \frac{4x-7}{8} = 1 - \frac{3}{8}x^2$
 5. $1 - \frac{1}{2} - x = \frac{x}{2}\left(\frac{x}{3} - x - 2\right) + \frac{11}{9}x^2$
 8. $\frac{5}{6}x^2 + x+1 = \frac{4x+5}{6} + \frac{x(3x+1)}{3}$
 11. $\frac{(x+1)(x-1)}{8} - 2x\left(x - \frac{2x+3}{2}\right) = 3x$
 14. $\frac{4x+7}{8} + \frac{3}{2}x(x+1) - \frac{11}{8}x^2 - 2x = 1$
 17. $\frac{x(2x-1)}{10} - \frac{18x-19}{20} - \frac{3}{20}x^2 = -x+1$
 20. $\frac{x-1}{2}\left(x - \frac{2x-3}{3}\right) - \frac{x(5x-16)}{24} + \frac{7}{6} = x$
 23. $\frac{10x^2+4x+3}{8} - \frac{x^2-2}{4} - \frac{x(x-1)}{2} - x = 1$

3. $\frac{11}{12} + \frac{x(2x-1)}{2} + \frac{x(2x+3)}{6} = 1$
 6. $\frac{4}{5} + \frac{x(2x+3)}{10} - \frac{3}{20}x(x+2) = 1$
 9. $\frac{x(3x+2)}{6} + \frac{x(x+2)}{3} + \frac{3}{8} - x = x^2$
 12. $\frac{3x^2-2x+2}{6} + \frac{x^2+1}{2} - \frac{x(x-1)}{3} = 1$
 15. $\frac{x(2x-3)}{2} - \frac{5x+1}{10} + 2x+1 = \frac{13}{5}x^2$
 18. $1 - \frac{x+8}{12} = \frac{11}{24}x^2 - \frac{x+2}{3}\left(\frac{x}{2} - \frac{x+1}{4}\right)$
 21. $\frac{2}{27}(9x+13) - \frac{x(x-1)}{3} + \frac{10}{27}x^2 - x = 1$
 24. $\frac{7}{8} + 3x\left(\frac{2x-3}{2} - 3x-2\right) + \frac{21}{2}x + 8x^2 = 1$

8. Resuelve la ecuación:

[$ax^2+bx=0$]

1. $\frac{x(x+6)}{12} - \frac{x(2x+1)}{4} + \frac{x(x+2)}{3} = x$
 4. $\frac{3}{5}x(x-1) - \frac{3}{2}x(x+1)+x^2 = \frac{x}{10} - 2x$
 7. $\frac{14}{15}x + \frac{3}{5}x(x+1) - \frac{3}{2}x(x-1)+x^2 = 3x$
 10. $\frac{3x-2}{2}\left(\frac{3x}{2} - 3x-2\right) + \frac{17}{8}x^2 = 2 - \frac{13}{8}x$
 13. $\frac{x(3x-2)}{8} + \frac{x(2x-3)}{4} = x^2 - \frac{x(6x+19)}{16}$

2. $x^2 - \frac{x(3x-1)}{5} - \frac{x(x-1)}{5} = \frac{x(x+2)}{6}$
 5. $\frac{x(2x+3)}{3} - \frac{x(13x-8)}{24} - \frac{x(x+1)}{4} = x$
 8. $\frac{x(3x+16)}{10} + \frac{x(2x-3)}{2} - \frac{x(x-1)}{5} = x^2$
 11. $\frac{2}{5}x(x+1) + \frac{x(3x+2)}{6} + \frac{x(x+1)}{5} - x^2 = x$
 14. $2x^2 - \frac{x(9x-23)}{20} - \frac{x(x-3)}{10} = \frac{3}{2}x(x+1)$

3. $\frac{x(x+1)}{2} - x^2 = \frac{x(x+3)}{4} - \frac{x(4x+1)}{8}$
 6. $\frac{x(x+8)}{12} + \frac{x(x+3)}{3} + \frac{3}{2}x(x-1) = 2x^2$
 9. $\frac{x(11x+13)}{24} + \frac{x(3x-2)}{8} + \frac{x(x-1)}{3} = x^2$
 12. $\frac{x(x+3)}{2} + \frac{x(x-2)}{5} - x^2 = 2x - \frac{2}{5}x(x+2)$
 15. $\frac{x(x-3)}{8} - \frac{x(9x-23)}{16} + 2x^2 = \frac{x(3x+2)}{2}$

$$16. \frac{3}{8}x - (x+2)\left(\frac{x-1}{2} - 2x+3\right) + 5 = \frac{13}{8}x^2 + x$$

$$17. x^2 - \frac{x(3x-1)}{6} - \frac{x(2x-1)}{9} - \frac{x(8x-11)}{18} = x$$

$$18. x^2 - \frac{x(3x-1)}{4} - x - \frac{x(2x-13)}{16} = \frac{x(3x-1)}{8}$$

$$19. \frac{6-5x^2}{20} - \frac{x+1}{5}\left(\frac{2x-1}{2} - 2x-3\right) - \frac{11}{10}x = 1$$

$$20. \frac{x(3x+2)}{8} - \frac{15}{16}x(x-1) + x^2 = \frac{x(2x+1)}{4} + x$$

$$21. \frac{2x^2+19x-9}{6} + 2x\left(x - \frac{x+3}{2}\right) = \frac{x^2-3}{2} + x^2$$

$$22. \frac{x(2x+3)}{3} - \frac{x(x-3)}{9} - 2x = x^2 - \frac{x(11x+14)}{27}$$

$$23. \frac{3}{2}x(x-1) - \frac{11}{20}x(6x-1) - x = x\left(\frac{2x}{5} - 2x-2\right)$$

$$24. x^2 - \frac{x-2}{2}\left(\frac{3x-3}{2} - x-1\right) - \frac{8}{5}x = \frac{19x^2+10}{20} - 3$$

9. Resuelve la ecuación:

[Dos sol.]

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

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

$$3. \frac{9}{10} - \frac{3}{10}x(x-1) = 1 - \frac{x(x+1)}{30}$$

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

$$5. \frac{2}{9}(x+3) + \frac{x(x-1)}{3} - \frac{7}{27}x^2 = 1$$

$$6. \frac{3}{4} + \frac{x(3x+2)}{4} - \frac{11}{12}x(x+1) = 1$$

$$7. \frac{11}{2} + \frac{x(2x+3)}{8} - \frac{x(3x+8)}{24} = 1$$

$$8. \frac{7x+2}{12} + \frac{2}{3}x(x+1) - \frac{7}{12}x^2 = x$$

$$9. \frac{x(3x-1)}{4} - \frac{x-4}{6} - \frac{7}{12}x^2 = -x+1$$

$$10. \frac{7}{9}x^2 + \frac{x(3x-2)}{9} + \frac{3x-1}{6} = x^2$$

$$11. \frac{13}{20}x^2 - \frac{3}{5}x(x-1) = x - \frac{9x-2}{20}$$

$$12. \frac{2x^2-1}{10} - \frac{11x-19}{20} - \frac{x-1}{5} + x = 1$$

$$13. x^2 - \frac{11x^2-4}{16} - \frac{x(x-1)}{2} = \frac{9}{16}x$$

$$14. \frac{5x+6}{9} - \frac{5}{9}x^2 - x = 1 - \frac{x(2x-1)}{6}$$

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

$$16. \frac{2x^2+1}{4} + \frac{13}{8}x-1 = 2x^2 - \frac{3}{4}x^2$$

$$17. \frac{x(3x-2)}{3} - \frac{2}{15}(6x^2+1) + x = \frac{x}{2}$$

$$18. \frac{2x^2+1}{2} - \frac{15}{16}x^2 + x-1 = \frac{14x-5}{16}$$

$$19. \frac{4x^2+3}{8} + \frac{x(3x+2)}{4} - \frac{19}{16}x = x^2$$

$$20. \frac{13}{20}x^2 - \frac{13x+2}{20} = \frac{x(3x+2)}{5} - x$$

$$21. \frac{7}{10}x - \frac{x(x-2)}{5} - x^2 = 1 - \frac{9x^2+4}{10}$$

$$22. 1 - \frac{9x+17}{18} + \frac{x(3x-1)}{3} = \frac{8}{9}x^2 - x$$

$$23. \frac{x(x-1)}{4} - \frac{3x^2-20}{24} + \frac{7}{24}x = 1$$

$$24. \frac{(x+1)(x-1)}{6} + \frac{x(x+1)}{3} - x^2 = \frac{11}{12}x$$

$$25. \frac{4}{9}x^2 - x+1 = \frac{x(3x+1)}{9} - \frac{17}{18}(x-1)$$

$$26. x^2 - \frac{6x^2-17}{20} - 1 = \frac{x(x-1)}{2} + \frac{11}{20}x$$

$$27. \frac{13}{12}x - x^2 = 1 - \frac{x(x-2)}{2} - \frac{7x^2+10}{12}$$

$$28. 2x^2 - \frac{2x^2-5}{6} - \frac{7}{4}x - \frac{3}{2}x(x-1) = 1$$

$$29. x^2 - \frac{2}{5}x(x+1) - 1 = \frac{9x^2-8}{10} + \frac{3}{20}x$$

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

$$31. \frac{7}{18}x^2 - \frac{(x+1)(x-1)}{3} - \frac{16x-9}{18} + x = 1$$

$$32. \frac{x(x+3)}{4} - \frac{11}{20}x - x^2 = 1 - \frac{14x^2+17}{20}$$

$$33. \frac{5x^2+18}{20} + \frac{x(3x+2)}{5} - \frac{13}{20}x - x^2 = 1$$

$$34. \frac{2}{3}x(x-1) - \frac{2}{27}(10x^2+3) + x = \frac{16}{27}x$$

$$35. \frac{(3x+1)(3x-1)}{10} + \frac{x(x+1)}{5} - \frac{7}{20}x - x^2 = 0$$

$$36. \frac{x^2}{10} - 3x\left(\frac{2x-3}{2} - x-1\right) + \frac{2}{5} = 7x$$

$$37. \frac{3x^2-1}{6} - \frac{x}{2}\left(\frac{x}{2} - x-2\right) - \frac{17}{12}x = x^2$$

$$38. \frac{5}{6} - 2x\left(\frac{3x-2}{2} - 3x+2\right) - \frac{5}{3}x(x-1) = 1$$

$$39. \frac{5}{6}x - 2x\left(\frac{3x-1}{2} - 2x+1\right) - \frac{2}{3}(x^2+1) = x$$

$$40. 2x^2 - \frac{12x^2+1}{24} = \frac{5}{3}x - \frac{x}{2}\left(\frac{x+2}{4} - 3x+3\right)$$

$$41. \frac{14x+15}{18} - \frac{x}{3}\left(\frac{2x}{3} - \frac{x+3}{6}\right) - x = 1 - \frac{5}{18}x^2$$

$$42. 1 - \frac{3}{16}x(2x+3) - (x-2)\left(\frac{x}{2} - \frac{2x+1}{4}\right) = \frac{9}{16}$$

10. Resuelve la ecuación:

[Sol. doble]

$$1. \frac{x(2x-1)}{2} - \frac{19}{10}x(x+1) + \frac{2}{5} = 2$$

$$2. \frac{x^2-2}{3} - \frac{6x+11}{12} + x+2 = \frac{x+2}{6}$$

$$3. \frac{x(13x-1)}{15} + \frac{x^2-2}{6} + \frac{11}{30} = x^2$$

$$4. x^2 - \frac{3x^2-1}{12} = \frac{x(2x-3)}{3} + \frac{7}{6}$$

$$5. 1 + \frac{x(2x+3)}{4} - \frac{5}{12}x(x+3) = \frac{1}{4}$$

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

$$7. \frac{x^2+1}{3} - x-1 = \frac{7}{24}x^2 - \frac{5}{6}(x+1)$$

$$8. 2x - \frac{17}{16}x^2 - \frac{x-3}{4} = 1 - \frac{x(x-2)}{2}$$

$$9. \frac{x(2x-3)}{4} + \frac{13}{12}x+1 = \frac{11x^2+8}{24}$$

$$10. \frac{2}{3}x(2x+1) - \frac{23}{24} = \frac{x(2x+1)}{3} - 1$$

$$11. 2x - \frac{3}{2}x(x+1) = \frac{6x+1}{16} - \frac{23}{16}x^2$$

$$12. \frac{2}{9}x - \frac{2}{27}(3x^2+8) - \frac{x(x+1)}{9} = x$$

$$13. \frac{x(2x+3)}{2} - \frac{7}{3}x^2 - 1 = x - \frac{2x+11}{12}$$

$$16. x - \frac{4}{5}x^2 - \frac{17x-19}{20} + \frac{x(3x-1)}{4} = 1$$

$$19. \frac{3}{16}(4x+5) - \frac{x(x-3)}{4} - x = \frac{3}{4}x^2 + 1$$

$$22. \frac{x^2-11}{20} + 1 = -3x\left(\frac{2x+1}{2} - x - 2\right) - \frac{21}{5}x$$

$$14. \frac{x^2-2}{12} + \frac{7}{24}x^2 + 1 = x - \frac{18x-19}{24}$$

$$17. x - \frac{2x-17}{18} - \frac{x(2x+3)}{3} = 1 - \frac{11}{18}x^2$$

$$20. x^2 - \frac{x(17x+16)}{24} + x = \frac{2x^2-1}{8} - \frac{13}{24}$$

$$23. \frac{5x^2+3}{8} - \frac{3x-2}{3}\left(\frac{x}{4} - x + 1\right) + \frac{7}{4}x - x^2 = 1$$

$$15. \frac{5}{4}x - \frac{3}{4}x(x+1) + x = \frac{2x-17}{18} + 1$$

$$18. \frac{x(x-3)}{12} - \frac{12x-23}{24} - \frac{11}{24}x^2 + x = 1$$

$$21. \frac{x(3x+1)}{6} - \frac{13}{24}x^2 - x = 1 - \frac{18x+23}{24}$$

$$24. \frac{11-17x^2}{30} - \frac{x+2}{3}\left(\frac{x}{5} - 2x - 1\right) - \frac{22}{15}x = 1$$

11. Resuelve la ecuación:

[Sin sol. $ax^2+c=0$]

$$1. \frac{11}{20}x^2 - \frac{2x-1}{5} - 1 = \frac{x(3x-2)}{5}$$

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

$$3. \frac{15x^2-1}{20} + \frac{x(x-2)}{5} + \frac{2}{5}x = x^2$$

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

$$5. x - \frac{19}{18}x^2 - \frac{5x-3}{6} = 1 - \frac{x(x-1)}{6}$$

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

$$7. \frac{x(2-3x)}{4} - \frac{x(x-10)}{20} = x + \frac{9}{20}$$

$$8. \frac{5}{6} + \frac{5}{6}x^2 - 2x = 2x\left(x - \frac{x+2}{2}\right) + 1$$

$$9. \frac{3}{5}(x+1) - \frac{11}{10}x^2 - x = 1 - \frac{x(x+2)}{5}$$

$$10. \frac{16x+19}{24} + \frac{2x^2+3}{12} + \frac{x+1}{3} - x = 1$$

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

$$12. \frac{x(3x+1)}{2} - \frac{7}{4}x^2 - x = 1 - \frac{8x+15}{16}$$

12. Resuelve la ecuación:

[Sin sol.]

$$1. x - \frac{17}{8} = \frac{x(3x-1)}{4} - \frac{x(5x-2)}{8}$$

$$2. \frac{4}{9}x(x+2) + \frac{x^2+1}{2} - \frac{7}{9}x^2 = x$$

$$3. \frac{x(x+2)}{8} + x\left(x - \frac{2x-1}{2}\right) + \frac{5}{8} = x$$

$$4. x - \frac{9x-5}{10} - \frac{3}{20}x^2 + \frac{x(x+2)}{10} = 1$$

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

$$6. \frac{2x+13}{24} + \frac{x(3x+2)}{3} - \frac{23}{24}x^2 = x$$

$$7. 1 - \frac{17x^2+5}{30} = \frac{x(2x-1)}{15} - \frac{2x^2-3}{3}$$

$$8. x\left(\frac{x}{2} - x - 1\right) + x^2 + 1 = \frac{4x^2+5}{10} - \frac{7}{5}x$$

$$9. \frac{4}{5}(x+1) + \frac{x(3x+2)}{5} - \frac{7}{10}x^2 - x = 1$$

$$10. \frac{2}{9}x + \frac{x(3x+2)}{6} - \frac{5}{18}(2x^2+5) = x$$

$$11. \frac{11}{12}x^2 - \frac{x(2x+3)}{2} - \frac{4x-1}{6} + 2x = 1$$

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

13. Resuelve la ecuación:

[$ax^2+c=0$]

$$1. \frac{5}{3} + \frac{x+7}{x-1} - \frac{29-3x}{9x-6} = 0$$

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

$$3. 2 - \frac{x^2+x+1}{x^2-2x} - \frac{x-5}{x-2} = \frac{x+2}{3x}$$

$$4. \frac{x-7}{x-2} - \frac{x^2+x+11}{x^2-x-2} + \frac{x-1}{x+1} = 10$$

$$5. \frac{8}{3} - \frac{x+3}{x+1} - \frac{x^2+x+1}{x^2+x} = \frac{3x-7}{3x}$$

$$6. \frac{3}{2} - \frac{x+1}{2x-6} - \frac{4x-15}{4x-12} = \frac{2x+1}{4x-4}$$

$$7. -\frac{x+1}{x-3} - \frac{x+12}{x+1} - \frac{x^2+x+49}{x^2-2x-3} = 6$$

$$8. \frac{2x+9}{4x+8} - \frac{4x^2+4x-21}{8x^2+12x-8} = \frac{x+1}{2x-1}$$

$$9. \frac{x+1}{3x+6} + \frac{x+1}{x+2} = 1 - \frac{3x^2+3x-11}{3x^2+3x-6}$$

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

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

$$12. \frac{4}{3} - \frac{x^2+x-4}{3x^2+7x+2} - \frac{3x+7}{9x+3} = \frac{x+1}{x+2}$$

$$13. \frac{10}{3} - \frac{x-1}{x+1} = \frac{x+10}{3x+3} - \frac{3x^2+3x-1}{3x^2-3}$$

$$14. \frac{x+1}{x+2} = \frac{3}{2} - \frac{2x+5}{4x+6} - \frac{x^2+x-8}{2x^2+7x+6}$$

$$15. \frac{2}{3} - \frac{x+1}{3x+1} - \frac{3x^2+3x-7}{27x^2-3} = \frac{3x-4}{9x-3}$$

$$16. \frac{4}{3} - \frac{3x+13}{9x-6} - \frac{(x+5)(x-4)}{3x^2+7x-6} = \frac{x+1}{x+3}$$

$$17. \frac{3x^2+3x+41}{9x^2+6x-3} + \frac{x+1}{3x-1} + \frac{3x+2}{3x+3} = 2$$

$$18. \frac{1}{x+2}\left(2x+6 - \frac{x^2+x-13}{x-2}\right) + \frac{x-3}{x-2} = 1$$

$$19. \frac{1}{4} - \frac{4x^2+4x-47}{16x^2-4} - \frac{x+1}{2x-1} = \frac{2x-3}{4x+2}$$

$$20. \frac{2x+5}{6x+6} + \frac{6x-11}{6x-18} = \frac{1}{3} - \frac{x^2+x+1}{3x^2-6x-9}$$

$$21. \frac{x+4}{3x-3} + \frac{1}{3} + \frac{x+1}{3x-6} = -\frac{x^2+x+6}{3x^2-9x+6}$$

$$22. \frac{3x+5}{3x+3} = 2 - \frac{3x^2+3x+26}{9x^2+15x+6} - \frac{x+1}{3x+2}$$

$$23. 8 - \frac{x^2-x+1}{2x^2+3x-9} + \frac{3x-43}{3x+9} = \frac{3x-29}{6x-9}$$

$$24. \frac{x^2+x+1}{x^2-1} + \frac{9x-1}{9x+9} = \frac{10}{9} - \frac{x^2+x-24}{9x^2-9}$$

14. Resuelve la ecuación:

[$ax^2+bx=0$]

1. $\frac{x+4}{x+2} = 4 - \left(2 - \frac{x}{x-3}\right)$
2. $3 - \left(2 - \frac{x-5}{x-1}\right) - \frac{x-18}{2x-3} = 0$
3. $\frac{x}{2x+2} - \frac{1}{2} + \left(2 - \frac{x-3}{x-2}\right) = 0$
4. $\frac{1}{3} - \frac{3x^2+3x+2}{27x^2-3} = \frac{x-1}{3x-1}$
5. $1 - \frac{x^2+x+5}{x^2-5x+6} - \frac{x+1}{x-3} = \frac{x-1}{x-2}$
6. $2 - \frac{x+1}{x+3} - \frac{x^2+x-11}{x^2+2x-3} = \frac{x+2}{x-1}$
7. $1 - \frac{x^2+x+1}{x^2+3x+2} - \frac{x-5}{x+2} = \frac{x+3}{x+1}$
8. $\frac{x+1}{x-3} - \frac{x^2+x+24}{x^2-9} + \frac{x-1}{x+3} = 2$
9. $\frac{2x+23}{4x+12} - \frac{x+1}{2x+6} - \frac{2x+3}{4x+4} = 1$
10. $\frac{7-x}{x+1} - \frac{x^2+x+11}{x^2+3x+2} - \frac{x+1}{x+2} = 1$
11. $\frac{x-3}{x+3} + \frac{x+1}{x-3} - \frac{(5-x)(6+x)}{x^2-9} = 2$
12. $\frac{x+1}{x+3} - \frac{1-x}{x-3} - \frac{(5-x)(6+x)}{x^2-9} = 4$
13. $4 - \frac{x^2+x-7}{2x^2-3x+1} = \frac{x-12}{2x-1} + \frac{x+1}{x-1}$
14. $1 - \frac{x^2+x-21}{4x^2-9} - \frac{x+1}{2x-3} = \frac{x-3}{2x+3}$
15. $\frac{3}{2} - \frac{x^2+x+2}{4x^2-1} - \frac{2x-5}{4x-2} = \frac{x+1}{2x+1}$
16. $\frac{10-3x}{3x+9} - \frac{3x-2}{3x-9} - \frac{x^2+x+1}{x^2-9} = 1$
17. $4 - \frac{x+1}{2x-1} - \frac{x(x+1)}{2x^2-5x+2} = \frac{x-10}{x-2}$
18. $\frac{x^2+x+3}{3x^2-11x+6} + \frac{x-6}{x-3} + \frac{x+1}{3x-2} = 2$
19. $\frac{2x+5}{2x+2} - \frac{1}{x+2} \left(2x - \frac{x^2+x-3}{x+1}\right) = 1$
20. $\frac{2}{3} - \frac{3x-10}{9x+3} - \frac{x^2+x-5}{3x^2-2x-1} = \frac{x+1}{x-1}$
21. $\frac{5x+7}{5x+10} + \frac{5x-22}{5x-15} + \frac{x^2+x+1}{x^2-x-6} = 2$
22. $\frac{2x+1}{4x+6} + \frac{x+1}{x+2} = \frac{3}{2} - \frac{x^2+x+5}{2x^2+7x+6}$
23. $2 - \frac{x+1}{3x-3} - \frac{3x^2+3x-5}{3x^2-3} = \frac{3x+2}{3x+3}$
24. $\frac{2x-17}{4x-2} \frac{x+1}{x-2} = \frac{3}{2} - \frac{x^2+x-13}{2x^2-5x+2} - \frac{x+1}{x-2}$

15. Resuelve la ecuación:

[Dos sol.]

1. $\frac{15-x}{x+2} - \frac{x^2+x-25}{x^2-4} - 1 = \frac{x+1}{x-2}$
2. $\frac{2x+9}{2x+2} + \frac{2x-9}{2x-2} + \frac{x^2+x+1}{x^2-1} = 2$
3. $\frac{x-3}{x+2} + \frac{x+5}{x-1} + 9 + \frac{x^2+x+1}{x^2+x-2} = 0$
4. $\frac{13-x}{x-1} - \frac{x+1}{x+2} - \frac{x^2+x+20}{x^2+x-2} = 1$
5. $\frac{1+x}{1-x} - \frac{x+16}{x+1} - \frac{x^2+x+29}{x^2-1} = 5$
6. $\frac{x-1}{3x-1} - \frac{3x+2}{27x-9} = \frac{8}{9} - \frac{3x+11}{9x+3}$
7. $\frac{3-x-x^2}{x^2-4x+3} - \frac{x+25}{x-3} - \frac{x+1}{x-1} = 9$
8. $-\frac{4(x-15)+8}{9(x+2)} - \frac{3x+2}{9x-9} = \frac{x+1}{x+2}$
9. $\frac{3+x}{3x-1} - \frac{(3-x)(4+x)}{3x^2+8x-3} + \frac{1+x}{x+3} = 1$
10. $1 - \frac{x-7}{3x+2} - \frac{x^2+x-21}{3x^2-4x-4} = \frac{x+1}{x-2}$
11. $\frac{1}{3} - \frac{12x+31}{12x+36} = \frac{1}{12} \left(3 + \frac{x+20}{x-1}\right)$
12. $\frac{11}{3} - \frac{x-43}{3x-3} - \frac{x^2+x-21}{x^2-3x+2} = \frac{x+1}{x-2}$
13. $\frac{x-48}{x-3} + \frac{x+20}{x-2} + \frac{x^2+x+1}{x^2-5x+6} = 6$
14. $\frac{1}{6} \left(\frac{17}{3} + \frac{3x-1}{9x+6}\right) - \frac{x+1}{3x} = \frac{6x-1}{6x}$
15. $\frac{2(x+7)}{x-2} + \frac{x^2+x+47}{x^2-5x+6} + \frac{x+1}{x-3} = 0$
16. $-\frac{8x+3}{8x-8} - \frac{8x+5}{8x+8} - \frac{x^2+x+1}{4x^2-4} = \frac{3}{4}$
17. $\frac{7-x}{x+2} - \frac{1}{x+2} \left(2x - \frac{x^2+x-1}{x+1}\right) = 4$
18. $\frac{x+1}{x-2} + \frac{x+3}{3x} + \frac{x^2+x+1}{x^2-2x} = \frac{5x+2}{3x-6}$
19. $\frac{3}{2} - \frac{2x-1}{4x-6} - \frac{(x+4)(x-3)}{2x^2+3x-9} = \frac{x+1}{x+3}$
20. $\frac{3}{2} - \frac{x^2+x-17}{2x^2+3x-2} - \frac{x+1}{x+2} = \frac{2x+3}{4x-2}$
21. $\frac{x-6}{3x-1} - \frac{1}{3x-1} \left(2x - \frac{x^2+x+1}{x+1}\right) = 1$
22. $-\frac{2x+3}{6x+2} - \frac{2x+9}{2x-2} - \frac{x^2+x+1}{3x^2-2x-1} = 1$
23. $\frac{4}{3} - \frac{x^2+x+12}{3x^2-8x+4} - \frac{x+1}{x-2} = \frac{3x-11}{9x-6}$
24. $\frac{x^2+x+1}{x^2+x-6} + \frac{5x+4}{5x+15} + \frac{5x+16}{5x-10} = -1$
25. $\frac{1-x}{x+2} - \frac{3x-5}{9x-3} - \frac{x^2+x+1}{3x^2+5x-2} = \frac{1}{3}$
26. $\frac{1}{x-3} \left(2x+6 - \frac{x^2+x+2}{x-2}\right) + \frac{x-8}{x-2} = 1$
27. $\frac{4x-15}{12x-8} + \frac{4x+5}{4x-8} + \frac{x^2+x+1}{3x^2-8x+4} = 1$
28. $\frac{x^2+x-11}{3x^2-3} - \frac{4x+17}{3x+3} + \frac{1}{3} + \frac{x+1}{x-1} = 0$
29. $\frac{4}{3} - \frac{3x+19}{9x+3} - \frac{x^2+x-8}{3x^2+7x+2} = \frac{x+1}{x+2}$
30. $\frac{1}{3} - \frac{3x-29}{9x-6} - \frac{x^2+x+32}{3x^2+7x-6} = \frac{x+1}{x+3}$
31. $\frac{x+50}{3x-9} + \frac{x+1}{x-3} = -3 - \frac{3x^2+3x+29}{3x^2-12x+9}$
32. $\frac{3x+32}{9x+3} + \frac{x^2+x-9}{3x^2+7x+2} = \frac{2}{3} - \frac{x+1}{x+2}$
33. $2 - \frac{3x+7}{3x+6} - \frac{3x^2+3x+23}{9x^2+21x+6} = \frac{x+1}{3x+1}$
34. $\frac{x^2+x-22}{x^2-3x} + \frac{x+1}{x} + \frac{x+1}{x-3} = \frac{5x+16}{2x}$
35. $\frac{2}{3} - \frac{3x-5}{9x-3} - \frac{x^2+x-5}{3x^2-7x+2} - \frac{x+1}{x-2} = 0$
36. $\frac{1}{2} - \frac{x+1}{2x-1} - \frac{4x^2+4x-5}{8x^2-20x+8} = \frac{4x-1}{4x-8}$

$$37. \frac{x+19}{x+3} + \frac{1}{x+3} \left(2x+4 - \frac{x^2+x+1}{x-1} \right) = 4$$

$$40. \frac{2x+1}{3x} - \frac{x^2+x+4}{9x^2-3x} - \frac{x^2+x+1}{3x^2-x} = \frac{x+1}{3x-1}$$

$$38. \frac{1}{3} - \frac{3x^2+3x-25}{27x^2-12} - \frac{x+1}{3x-2} = \frac{x-3}{3x+2}$$

$$41. \frac{3}{4} - \frac{(2x+7)(2x-5)}{16x^2-36} - \frac{x+1}{2x+3} = \frac{x+3}{2x-3}$$

$$39. \frac{3}{2} - \frac{x+1}{2x-6} - \frac{2x^2+2x-25}{2x^2-8x+6} = \frac{2x-11}{2x-2}$$

$$42. \frac{2x^2+2x+5}{4x^2+18x+18} + \frac{2x+19}{2x+6} + \frac{x+1}{2x+3} = 4$$

16. Resuelve la ecuación:

[Sol. doble]

$$1. \frac{x-1}{x+1} - \frac{x-19}{9x+9} + \frac{x-9}{9x-9} = 2$$

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

$$7. \frac{7}{4} - \frac{x^2+x+1}{2x^2+x} - \frac{x+1}{x} = \frac{4x-1}{8x+4}$$

$$10. \frac{1-x}{x+2} - \frac{x+1}{x-3} - \frac{x^2+x+32}{x^2-x-6} = 6$$

$$13. 2 - \frac{x-18}{x+3} - \frac{x^2+x+1}{x^2+4x+3} = \frac{x+13}{x+1}$$

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

$$19. 2 - \frac{x+1}{3x+1} - \frac{x^2+x-7}{3x^2+10x+3} = \frac{x+6}{x+3}$$

$$22. \frac{x}{x+3} + \frac{2x+9}{4x+6} = \frac{3}{2} - \frac{x^2+x+1}{2x^2+9x+9}$$

$$2. \frac{6-x}{x+1} - \frac{x^2+x-5}{x^2-1} - \frac{x+1}{x-1} = 1$$

$$5. \frac{x-4}{x+2} + \frac{x+1}{x-2} = 2 - \frac{x^2+x-17}{x^2-4}$$

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

$$11. \frac{8x-23}{8x-24} = 1 - \frac{1}{8} \left(\frac{3x-26}{9x-3} + \frac{7}{3} \right)$$

$$14. \frac{x+22}{x-1} - 17 = \frac{x-1}{x+1} - \frac{x^2-x-47}{x^2-1}$$

$$17. \frac{x-9}{2x} + \frac{x^2+x-3}{x^2-x} = \frac{3}{2} - \frac{x^2+x+1}{2x^2-2x}$$

$$20. \frac{1}{3} - \frac{3x^2+3x-1}{27x^2-3} - \frac{x+1}{3x-1} = \frac{x}{3x+1}$$

$$23. \frac{3x+4}{3x+3} + \frac{1}{9x} \left(2x - \frac{x^2+x-4}{x+1} \right) = \frac{1}{9}$$

$$3. \frac{3}{2} - \frac{2x-11}{4x-2} - \frac{x+1}{x-2} = \frac{x+3}{2x-1}$$

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

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

$$12. \frac{x-1}{x+1} - \frac{x^2+x+17}{x^2-2x-3} + \frac{x-38}{x-3} = 17$$

$$15. -\frac{x+5}{x-2} - \frac{1}{x-2} \left(x - \frac{x^2+x-1}{2x+2} \right) = \frac{1}{2}$$

$$18. \frac{x^2+x+1}{x^2+x-6} + \frac{5x-8}{5x-10} + \frac{5x+18}{5x+15} = 2$$

$$21. \frac{3}{2} - \frac{2x-5}{4x-2} - \frac{x^2+x+1}{4x^2-1} - \frac{x+1}{2x+1} = 0$$

$$24. \frac{1-2x}{4x+2} - \frac{x+1}{x+3} - \frac{x^2+x+9}{2x^2+7x+3} = \frac{5}{2}$$

17. Resuelve la ecuación:

[Sol. falsa]

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

$$4. \frac{x-1}{3x+1} - \frac{3x-4}{27x-9} = \frac{x}{3x-1} - \frac{4}{9}$$

$$7. \frac{3x-3}{2x+2} + \frac{x^2+x+1}{x^2-1} = 1 - \frac{2x-5}{2x-2}$$

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

$$13. \frac{x+2}{x+1} + \frac{x-1}{2x+1} = 1 - \frac{x^2+x+1}{2x^2+3x+1}$$

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

$$19. \frac{4x+1}{4x+4} - \frac{4x+21}{4x-12} - \frac{x^2-x+1}{x^2-2x-3} = 2$$

$$22. \frac{8x+7}{16x+8} + \frac{x^2+x+1}{4x^2-1} = \frac{3}{4} - \frac{8x+1}{16x-8}$$

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

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

$$8. \frac{x-12}{x+1} + \frac{x+1}{x-2} + \frac{x^2+x-39}{x^2-x-2} = 6$$

$$11. \frac{x-1}{x+1} - \frac{x+1}{2x+1} - \frac{x^2-x-1}{2x^2+3x+1} = 1$$

$$14. \frac{x+1}{2x+1} = 1 - \frac{x+4}{x+3} - \frac{x^2+x-1}{2x^2+7x+3}$$

$$17. \frac{5-x}{2x+3} - \frac{x^2+x+9}{2x^2+9x+9} - \frac{x+1}{x+3} = 1$$

$$20. \frac{x^2+x+40}{2x^2+x-6} + \frac{x-14}{2x-3} + \frac{x+1}{x+2} + 1 = 0$$

$$23. \frac{x-4}{x-2} + \frac{1}{x-3} \left(2x+6 - \frac{x^2+x-4}{x-2} \right) = 1$$

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

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

$$9. 3 - \frac{x+2}{2x-3} - \frac{x^2+x-16}{2x^2+x-6} = \frac{x+1}{x+2}$$

$$12. \frac{x(x+1)}{2x^2-3x+1} + \frac{x-5}{x-1} + \frac{x+1}{2x-1} = 3$$

$$15. \frac{x-1}{3x-2} + \frac{x+1}{3x+2} = \frac{4}{9} - \frac{3x+1}{27x-18}$$

$$18. \frac{10-x}{2x+3} - \frac{x+1}{x+2} - \frac{x^2+x+5}{2x^2+7x+6} = 1$$

$$21. \frac{x+10}{x+1} + \frac{1}{x+2} \left(2x - \frac{x^2+x+9}{x+1} \right) = 4$$

$$24. \frac{2x-5}{2x-2} + \frac{x^2+x+1}{x^2-1} + \frac{2x+13}{2x+2} = 6$$

18. Resuelve la ecuación:

[Sin sol. $ax^2+c=0$]

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

$$2. -\frac{x+1}{x-2} - \frac{x+8}{x-3} - \frac{x^2+x+14}{x^2-5x+6} = 1$$

$$3. \frac{6-x}{x-1} - \frac{x^2+x+23}{x^2+2x-3} = \frac{x+1}{x+3} + 1$$

$$4. \frac{x+2}{x-1} - \frac{x^2+x+29}{x^2-1} + \frac{x-1}{x+1} = 10$$

$$7. \frac{2-x}{2+x} - \frac{x+1}{x-2} - \frac{x^2+x+47}{x^2-4} = 13$$

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

$$5. \frac{x-1}{x+1} + \frac{x-14}{x-2} - \frac{x^2+x+31}{x^2-x-2} = 17$$

$$8. \frac{x+10}{x+2} + \frac{x-22}{x-3} = 12 - \frac{x^2+x+1}{x^2-x-6}$$

$$11. \frac{4-3x}{9x-6} - \frac{x+1}{3x+2} - \frac{3x^2+3x+29}{27x^2-12} = 1$$

$$6. \frac{x-1}{x+2} - \frac{1}{2} - \frac{x^2-x+10}{2x^2-x-3} = \frac{2x-9}{4x-6}$$

$$9. \frac{x+18}{3x+1} - \frac{x-1}{x+1} = 5 - \frac{x^2-x-23}{3x^2+4x+1}$$

$$12. \frac{1}{3} - \frac{1}{3x+2} \left(\frac{3x+2}{3} - \frac{2x^2-x-3}{3x-2} \right) = \frac{x-1}{3x-2}$$

19. Resuelve la ecuación:

[Sin sol.]

$$1. \frac{1}{3} - \frac{1}{3} \left(2 - \frac{x+21}{x+1} \right) = \frac{x+17}{3x}$$

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

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

$$4. \frac{x-5}{x-2} + \frac{x+1}{x+3} + \frac{x^2+x+18}{x^2+x-6} = 2$$

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

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

$$7. \frac{x+1}{x-3} + \frac{x-10}{x+1} = 2 - \frac{x^2+x-27}{x^2-2x-3}$$

$$8. \frac{4}{3} - \frac{x+4}{x} - \frac{x^2+x+1}{3x^2+x} = \frac{3x-44}{9x+3}$$

$$9. \frac{x-16}{x+3} + \frac{x+16}{x+2} + \frac{x^2+x+1}{x^2+5x+6} = 2$$

$$10. \frac{x+5}{3x-2} + 1 = \frac{2(2x+5)}{3x+2} - \frac{x^2-x-1}{9x^2-4}$$

$$11. \frac{x-1}{x+1} - \frac{x^2+x+8}{3x^2+4x+1} + \frac{3x+16}{9x+3} = \frac{4}{3}$$

$$12. \frac{4}{3} - \frac{3x-10}{9x+6} - \frac{x^2+x-4}{3x^2-4x-4} = \frac{x+1}{x-2}$$

— Soluciones —

- 1.1. $\pm \frac{3}{2}$ 1.2. $\pm \frac{1}{2}$ 1.3. $\pm \frac{1}{3}$ 1.4. $\pm \frac{3}{4}$ 1.5. ± 1 1.6. ± 1 1.7. ± 3 1.8. ± 1 1.9. $\pm \frac{1}{3}$ 1.10. $\pm \frac{1}{3}$ 1.11. $\pm \frac{2}{3}$ 1.12. $\pm \frac{3}{2}$ 1.13. ± 1 1.14. ± 3 1.15. $\pm \frac{1}{2}$ 1.16. $\pm \frac{1}{4}$
 1.17. $\pm \frac{1}{2}$ 1.18. $\pm \frac{1}{2}$ 1.19. $\pm \frac{1}{3}$ 1.20. ± 3 1.21. ± 4 1.22. $\pm \frac{1}{2}$ 1.23. ± 4 1.24. ± 1 2.1. 0, 1 2.3. $\frac{-1}{2}, 0$ 2.4. 0, $\frac{1}{3}$ 2.5. 0, $\frac{3}{4}$ 2.6. 0, 2 2.7. -4, 0 2.8. -1, 0
 2.9. $\frac{-1}{2}, 0$ 2.10. $\frac{-2}{3}, 0$ 2.11. 0, $\frac{1}{2}$ 2.12. 0, $\frac{2}{3}$ 2.13. -3, 0 2.14. $\frac{-2}{3}, 0$ 2.15. 0, 1 2.16. 0, $\frac{1}{3}$ 2.17. $\frac{-1}{3}, 0$ 2.18. -1, 0 2.19. 0, $\frac{2}{3}$ 2.20. $\frac{-4}{3}, 0$ 2.21. 0, $\frac{3}{2}$
 2.22. -1, 0 2.23. 0, $\frac{4}{3}$ 2.24. 0, 2 3.1. $\frac{1}{2}, 1$ 3.2. -1, $\frac{1}{4}$ 3.3. -2, $\frac{1}{2}$ 3.4. -1, 2 3.5. $\frac{-2}{3}, \frac{3}{2}$ 3.6. -1, $\frac{2}{3}$ 3.7. -3, $\frac{1}{2}$ 3.8. -1, $\frac{1}{2}$ 3.9. $\frac{-1}{2}, \frac{4}{3}$ 3.10. $\frac{1}{2}, 4$ 3.11. -2, -1
 3.12. $\frac{1}{2}, 1$ 3.13. -1, $\frac{3}{4}$ 3.14. -1, $\frac{2}{3}$ 3.15. -2, $\frac{-3}{2}$ 3.16. -2, $\frac{3}{2}$ 3.17. -4, $\frac{1}{2}$ 3.18. $\frac{-1}{4}, 2$ 3.19. $\frac{1}{2}, \frac{3}{4}$ 3.20. -1, $\frac{-1}{4}$ 3.21. $\frac{4}{3}, 3$ 3.22. $\frac{-2}{3}, 2$ 3.23. -1, $\frac{-1}{2}$
 3.24. $\frac{3}{4}, 2$ 3.25. $\frac{-1}{2}, \frac{4}{3}$ 3.26. $\frac{1}{2}, 1$ 3.27. $\frac{-1}{2}, 4$ 3.28. $\frac{-1}{3}, 1$ 3.29. -4, $\frac{-3}{2}$ 3.30. -1, $\frac{-1}{2}$ 3.31. $\frac{-3}{2}, 4$ 3.32. -2, $\frac{1}{4}$ 3.33. $\frac{-3}{4}, \frac{1}{2}$ 3.34. -1, $\frac{3}{2}$ 3.35. $\frac{1}{4}, 4$ 3.36. -4, -3
 3.37. $\frac{1}{4}, \frac{1}{3}$ 3.38. $\frac{1}{2}, 1$ 3.39. $\frac{3}{2}, 4$ 3.40. $\frac{-1}{3}, \frac{3}{2}$ 3.41. $\frac{-4}{3}, 4$ 3.42. $\frac{-4}{3}, \frac{-2}{3}$ 4.1. -1 4.2. 1 4.3. 2 4.4. $\frac{1}{4}$ 4.5. $\frac{-1}{2}$ 4.6. $\frac{1}{2}$ 4.7. -4 4.8. 4 4.9. $\frac{-3}{2}$
 4.10. $\frac{-1}{3}$ 4.11. -3 4.12. $\frac{1}{2}$ 4.13. 3 4.14. -4 4.15. -2 4.16. -4 4.17. 1 4.18. 4 4.19. $\frac{1}{3}$ 4.20. $\frac{-3}{2}$ 4.21. $\frac{1}{2}$ 4.22. 4 4.23. $\frac{3}{4}$ 4.24. -1 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. s.s.r. 6.2. s.s.r. 6.3. s.s.r.
 6.4. s.s.r. 6.5. s.s.r. 6.6. s.s.r. 6.7. s.s.r. 6.8. s.s.r. 6.9. s.s.r. 6.10. s.s.r. 6.11. s.s.r. 6.12. s.s.r. 7.1. $\pm \frac{3}{4}$ 7.2. ± 1 7.3. $\pm \frac{1}{4}$ 7.4. ± 3 7.5. $\pm \frac{3}{4}$ 7.6. ± 2
 7.7. ± 1 7.8. ± 1 7.9. $\pm \frac{3}{2}$ 7.10. ± 2 7.11. ± 1 7.12. $\pm \frac{1}{2}$ 7.13. $\pm \frac{1}{4}$ 7.14. ± 1 7.15. $\pm \frac{3}{4}$ 7.16. ± 1 7.17. ± 1 7.18. $\pm \frac{2}{3}$ 7.19. ± 2 7.20. ± 4 7.21. ± 1 7.22. $\pm \frac{1}{3}$
 7.23. $\pm \frac{1}{2}$ 7.24. $\pm \frac{1}{4}$ 8.1. -1, 0 8.2. -2, 0 8.3. $\frac{-1}{2}, 0$ 8.4. 0, 2 8.5. 0, $\frac{2}{3}$ 8.6. 0, 2 8.7. $\frac{-1}{3}, 0$ 8.8. -3, 0 8.9. 0, $\frac{1}{4}$ 8.10. 0, 1 8.11. 0, $\frac{2}{3}$ 8.12. 0, 1
 8.13. $\frac{-3}{4}, 0$ 8.14. -1, 0 8.15. -1, 0 8.16. -1, 0 8.17. $\frac{-2}{3}, 0$ 8.18. 0, $\frac{3}{4}$ 8.19. -4, 0 8.20. -1, 0 8.21. 0, 1 8.22. -4, 0 8.23. 0, $\frac{1}{4}$ 8.24. 0, $\frac{3}{4}$ 9.1. -4, 1
 9.2. $\frac{-1}{3}, \frac{3}{4}$ 9.3. $\frac{1}{2}, \frac{3}{4}$ 9.4. -1, $\frac{3}{2}$ 9.5. $\frac{-3}{2}, 3$ 9.6. $\frac{-3}{2}, -1$ 9.7. -1, $\frac{2}{3}$ 9.8. -2, -1 9.9. -4, $\frac{1}{2}$ 9.10. -3, $\frac{1}{2}$ 9.11. -2, 1 9.12. -1, $\frac{-1}{4}$ 9.13. $\frac{-4}{3}, 1$ 9.14. -2, $\frac{-3}{4}$
 9.15. -2, -1 9.16. $\frac{2}{3}, \frac{3}{2}$ 9.17. $\frac{-1}{2}, \frac{4}{3}$ 9.18. -3, 1 9.19. $\frac{3}{4}, 2$ 9.20. -1, 2 9.21. $\frac{2}{3}, 3$ 9.22. -1, $\frac{-1}{2}$ 9.23. $\frac{-4}{3}, 1$ 9.24. $\frac{-2}{3}, \frac{-1}{2}$ 9.25. $\frac{1}{2}, 1$ 9.26. $\frac{-3}{4}, 1$ 9.27. -2, 1
 9.28. $\frac{-1}{2}, 2$ 9.29. $\frac{-4}{3}, \frac{-1}{2}$ 9.30. $\frac{1}{2}, 1$ 9.31. -3, 1 9.32. 1, 3 9.33. -1, $\frac{-2}{3}$ 9.34. -2, $\frac{-3}{2}$ 9.35. $\frac{-1}{2}, 2$ 9.36. -4, -1 9.37. -1, $\frac{-2}{3}$ 9.38. $\frac{-1}{4}, \frac{1}{2}$ 9.39. $\frac{-1}{2}, 4$
 9.40. -1, $\frac{1}{3}$ 9.41. -1, $\frac{3}{2}$ 9.42. $\frac{-1}{2}, \frac{-1}{3}$ 10.1. $\frac{-4}{3}$ 10.2. $\frac{-1}{2}$ 10.3. 1 10.4. 1 10.5. 3 10.6. 1 10.7. 2 10.8. $\frac{2}{3}$ 10.9. -4 10.10. $\frac{-1}{4}$ 10.11. 1 10.12. $\frac{-4}{3}$
 10.13. $\frac{1}{4}$ 10.14. $\frac{1}{3}$ 10.15. $\frac{1}{2}$ 10.16. -1 10.17. -1 10.18. $\frac{1}{3}$ 10.19. $\frac{1}{4}$ 10.20. -4 10.21. -1 10.22. 3 10.23. $\frac{-1}{3}$ 10.24. -1 11.1. s.s.r. 11.2. s.s.r.
 11.3. s.s.r. 11.4. s.s.r. 11.5. s.s.r. 11.6. s.s.r. 11.7. s.s.r. 11.8. s.s.r. 11.9. s.s.r. 11.10. s.s.r. 11.11. s.s.r. 11.12. s.s.r. 12.1. s.s.r. 12.2. s.s.r. 12.3. s.s.r.
 12.4. s.s.r. 12.5. s.s.r. 12.6. s.s.r. 12.7. s.s.r. 12.8. s.s.r. 12.9. s.s.r. 12.10. s.s.r. 12.11. s.s.r. 12.12. s.s.r. 13.1. $\pm \frac{1}{3}$ 13.2. ± 3 13.3. ± 1 13.4. $\pm \frac{2}{3}$
 13.5. ± 2 13.6. ± 2 13.7. $\pm \frac{2}{3}$ 13.8. ± 1 13.9. $\pm \frac{3}{2}$ 13.10. ± 1 13.11. ± 1 13.12. ± 1 13.13. $\pm \frac{2}{3}$ 13.14. ± 3 13.15. ± 2 13.16. ± 1 13.17. ± 4 13.18. ± 1

13.19. $\pm\frac{3}{2}$ 13.20. $\pm\frac{3}{2}$ 13.21. $\pm\frac{1}{2}$ 13.22. ± 3 13.23. $\pm\frac{1}{4}$ 13.24. $\pm\frac{2}{3}$ 14.1. $0, \frac{1}{2}$ 14.2. $\frac{-1}{3}, 0$ 14.3. $0, \frac{1}{2}$ 14.4. $0, 1$ 14.5. $\frac{-1}{2}, 0$ 14.6. $-2, 0$ 14.7. $0, \frac{1}{2}$
 14.8. $-1, 0$ 14.9. $\frac{-2}{3}, 0$ 14.10. $\frac{-1}{4}, 0$ 14.11. $0, 1$ 14.12. $0, 1$ 14.13. $0, \frac{1}{4}$ 14.14. $0, 3$ 14.15. $-2, 0$ 14.16. $0, \frac{3}{4}$ 14.17. $\frac{-1}{4}, 0$ 14.18. $0, 1$ 14.19. $0, \frac{1}{2}$
 14.20. $\frac{-2}{3}, 0$ 14.21. $0, 1$ 14.22. $0, 2$ 14.23. $-4, 0$ 14.24. $0, 1$ 15.1. $\frac{1}{4}, 3$ 15.2. $-3, 2$ 15.3. $\frac{-4}{3}, \frac{1}{4}$ 15.4. $\frac{-3}{4}, 3$ 15.5. $\frac{-3}{2}, \frac{-3}{4}$ 15.6. $1, \frac{4}{3}$ 15.7. $\frac{-1}{4}, \frac{4}{3}$
 15.8. $\frac{-1}{4}, \frac{3}{4}$ 15.9. $-1, \frac{1}{2}$ 15.10. $-1, \frac{1}{2}$ 15.11. $-2, \frac{-4}{3}$ 15.12. $-2, \frac{-1}{4}$ 15.13. $-1, \frac{1}{3}$ 15.14. $-1, \frac{-1}{3}$ 15.15. $\frac{-3}{2}, \frac{-1}{2}$ 15.16. $\frac{-3}{4}, \frac{1}{3}$ 15.17. $\frac{-2}{3}, \frac{-1}{2}$ 15.18. $-3, \frac{1}{2}$
 15.19. $-1, 3$ 15.20. $-4, 3$ 15.21. $-2, \frac{-2}{3}$ 15.22. $\frac{-3}{2}, \frac{-1}{4}$ 15.23. $-4, -3$ 15.24. $-1, \frac{-3}{4}$ 15.25. $\frac{-1}{2}, \frac{2}{3}$ 15.26. $1, 4$ 15.27. $-2, \frac{-1}{2}$ 15.28. $2, 4$ 15.29. $-3, -1$
 15.30. $\frac{3}{4}, 1$ 15.31. $\frac{-3}{4}, \frac{-1}{4}$ 15.32. $-3, \frac{-4}{3}$ 15.33. $-4, 2$ 15.34. $-1, 2$ 15.35. $-2, \frac{2}{3}$ 15.36. $\frac{-4}{3}, 1$ 15.37. $\frac{3}{2}, 4$ 15.38. $\frac{1}{4}, 1$ 15.39. $\frac{-1}{2}, 2$ 15.40. $-4, -2$ 15.41.
 $-4, \frac{-1}{2}$ 15.42. $-2, \frac{-1}{4}$ 16.1. $\frac{-1}{3}$ 16.2. $\frac{1}{2}$ 16.3. -1 16.4. 2 16.5. 1 16.6. -2 16.7. -2 16.8. $\frac{2}{3}$ 16.9. 1 16.10. $\frac{1}{3}$ 16.11. 2 16.12. $\frac{-1}{4}$ 16.13. 4 16.14.
 $\frac{3}{4}$ 16.15. $\frac{-3}{2}$ 16.16. $\frac{-3}{2}$ 16.17. 2 16.18. -1 16.19. 2 16.20. $\frac{-1}{2}$ 16.21. -1 16.22. 1 16.23. $\frac{-2}{3}$ 16.24. $\frac{-4}{3}$ 17.1. inc 17.2. 3 17.3. inc 17.4. 1 17.5.
 $\frac{-1}{3}$ 17.6. $\frac{1}{3}$ 17.7. $\frac{1}{2}$ 17.8. $\frac{-2}{3}$ 17.9. -1 17.10. -3 17.11. -2 17.12. -1 17.13. inc 17.14. inc 17.15. -1 17.16. 3 17.17. $\frac{-2}{3}$ 17.18. $\frac{2}{3}$ 17.19. $\frac{-1}{3}$
 17.20. $\frac{1}{3}$ 17.21. -2 17.22. -1 17.23. -1 17.24. $\frac{2}{3}$ 18.1. s.s.r. 18.2. s.s.r. 18.3. s.s.r. 18.4. s.s.r. 18.5. s.s.r. 18.6. s.s.r. 18.7. s.s.r. 18.8. s.s.r.
 18.9. s.s.r. 18.10. s.s.r. 18.11. s.s.r. 18.12. s.s.r. 19.1. s.s.r. 19.2. s.s.r. 19.3. s.s.r. 19.4. s.s.r. 19.5. s.s.r. 19.6. s.s.r. 19.7. s.s.r. 19.8. s.s.r. 19.9.
 s.s.r. 19.10. s.s.r. 19.11. s.s.r. 19.12. s.s.r.