

GUIA DE TRABAJO

Materia: Matemáticas Guía #97.

**Tema: Resolución de bicuadráticas utilizando la resolvente. (Hoffmann
3r año, ejercicios #45 y #48).**

Fecha: _____

Profesor: Fernando Viso

Nombre del alumno: _____

Sección del alumno: _____

CONDICIONES:

- Trabajo individual.
- Sin libros, ni cuadernos, ni notas.
- Sin celulares.
- Es obligatorio mostrar explícitamente, el procedimiento empleado para resolver cada problema.
- No se contestarán preguntas ni consultas de ningún tipo.
- No pueden moverse de su asiento. ni pedir borras, ni lápices, ni calculadoras prestadas.

Marco Teórico:

Resolvente de la ecuación $ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

PREGUNTAS:

EJERCICIO #45.

Resolver las siguientes ecuaciones con raíces irracionales:

1.- $x^2 + 2x - 1 = 0$

Solución:

$$x^2 + 2x - 1 = 0 \Rightarrow x = \frac{-2 \pm \sqrt{(2)^2 + 4(1)}}{2} = \frac{-2 \pm 2\sqrt{2}}{2} \Rightarrow$$

$$\Rightarrow x_1 = -1 + \sqrt{2}; x_2 = -1 - \sqrt{2}$$

2.- $x^2 + 6x - 4 = 0$

Solución:

$$x^2 + 6x - 4 = 0 \Rightarrow x = \frac{-6 \pm \sqrt{6^2 + 4(4)}}{2} = \frac{-6 \pm \sqrt{52}}{2} \Rightarrow$$
$$\Rightarrow x = -3 \pm \sqrt{13} \Rightarrow x_1 = -3 + \sqrt{13}; x_2 = -3 - \sqrt{13}$$

3.- $x^2 - 5x - 3 = 0$

Solución:

$$x^2 - 5x - 3 = 0 \Rightarrow x = \frac{5 \pm \sqrt{(5)^2 + 4(3)}}{2} = \frac{5 \pm \sqrt{37}}{2} \Rightarrow$$
$$\Rightarrow x_1 = \frac{5 + \sqrt{37}}{2}; x_2 = \frac{5 - \sqrt{37}}{2}$$

4.- $4x^2 - 9x + 3 = 0$

Solución:

$$4x^2 - 9x + 3 = 0 \Rightarrow x = \frac{9 \pm \sqrt{(9)^2 - 4(4)(3)}}{8} = \frac{9 \pm \sqrt{81 - 48}}{8} \Rightarrow$$
$$\Rightarrow x = \frac{9 \pm \sqrt{33}}{8} \Rightarrow x_1 = \frac{9 + \sqrt{33}}{8}; x_2 = \frac{9 - \sqrt{33}}{8}$$

5.- $x^2 + 2x + 5 = 0$

Solución:

$$x^2 + 2x + 5 = 0 \Rightarrow x = \frac{-2 \pm \sqrt{(2)^2 - 4(5)}}{2} = \frac{-2 \pm \sqrt{-16}}{2}$$

NO TIENE RAICES REALES.

6.- $3x^2 + 2x - 3 = 0$

Solución:

$$3x^2 + 2x - 3 = 0 \Rightarrow x = \frac{-2 \pm \sqrt{(2)^2 + 4(3)(3)}}{6} = \frac{-2 \pm 2\sqrt{10}}{6} \Rightarrow$$
$$\Rightarrow x = \frac{-1 \pm \sqrt{10}}{3} \Rightarrow x_1 = \frac{-1 + \sqrt{10}}{3}; x_2 = \frac{-1 - \sqrt{10}}{3}$$

7.- $2x^2 + 3x + 3 = 0$

Solución:

$$2x^2 + 3x + 3 = 0 \Rightarrow x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(3)}}{4} = \frac{-3 \pm \sqrt{-15}}{4}$$

NO TIENE RAICES REALES.

8.- $3m^2 + 7m + 3 = 0$

Solución:

$$3m^2 + 7m + 3 = 0 \Rightarrow m = \frac{-7 \pm \sqrt{(7)^2 - 4(3)(3)}}{6} = \frac{-7 \pm \sqrt{49 - 36}}{6} \Rightarrow$$
$$\Rightarrow x_1 = \frac{-7 + \sqrt{13}}{6}; x_2 = \frac{-7 - \sqrt{13}}{6}$$

9.- $5x^2 - 8x + 2 = 0$

Solución:

$$5x^2 - 8x + 2 = 0 \Rightarrow x = \frac{8 \pm \sqrt{(8)^2 - 4(5)(2)}}{10} = \frac{8 \pm \sqrt{24}}{10} \Rightarrow$$
$$\Rightarrow x = \frac{8 \pm 2\sqrt{6}}{10} = \frac{4 \pm \sqrt{6}}{5} \Rightarrow x_1 = \frac{4 + \sqrt{6}}{5}; x_2 = \frac{4 - \sqrt{6}}{5}$$

10.- $x^2 + 6x + 2 = 0$

Solución:

$$x^2 + 6x + 2 = 0 \Rightarrow x = \frac{-6 \pm \sqrt{(6)^2 - 4(2)}}{2} = \frac{-6 \pm \sqrt{28}}{2} \Rightarrow$$
$$\Rightarrow x = -3 \pm \sqrt{7} \Rightarrow x_1 = -3 + \sqrt{7}; x_2 = -3 - \sqrt{7}$$

11.- $5x^2 + 7x + 6 = 0$

Solución:

$$5x^2 + 7x + 6 = 0 \Rightarrow x = \frac{-7 \pm \sqrt{(7)^2 - 4(5)(6)}}{10} = \frac{-7 \pm \sqrt{-71}}{10}$$

NO TIENE RAICES REALES.

$$12.- 6x^2 - 11x - 4 = 0$$

Solución:

$$6x^2 - 11x - 4 = 0 \Rightarrow x = \frac{11 \pm \sqrt{(11)^2 + 4(6)(4)}}{12} = \frac{11 \pm \sqrt{121 + 96}}{12} \Rightarrow$$
$$\Rightarrow x = \frac{11 \pm \sqrt{217}}{12} \Rightarrow x_1 = \frac{11 + \sqrt{217}}{12}; x_2 = \frac{11 - \sqrt{217}}{12}$$

$$13.- 7a^2 - 6a - 2 = 0$$

Solución:

$$7a^2 - 6a - 2 = 0 \Rightarrow a = \frac{6 \pm \sqrt{(6)^2 + 4(7)(2)}}{14} = \frac{6 \pm \sqrt{92}}{14} \Rightarrow$$
$$\Rightarrow a = \frac{6 \pm 2\sqrt{23}}{14} = \frac{3 \pm \sqrt{23}}{7} \Rightarrow x_1 = \frac{3 + \sqrt{23}}{7}; x_2 = \frac{3 - \sqrt{23}}{7}$$

$$14.- 7,32x^2 - 13,7x + 0,045 = 0$$

Solución:

$$7,32x^2 - 13,7x + 0,045 = 0 \Rightarrow x = \frac{13,7 \pm \sqrt{(13,7)^2 - 4(7,32)(0,045)}}{2(7,32)} \Rightarrow$$
$$\Rightarrow x = \frac{13,7 \pm \sqrt{187,69 - 1,3176}}{14,64} = \frac{13,7 \pm \sqrt{186,3724}}{14,64} \Rightarrow$$
$$\Rightarrow x = \frac{13,7 \pm 13,6518}{14,64} \Rightarrow x_1 = \frac{13,7 + 13,6518}{14,64} = \frac{27,3518}{14,64} = 1,86829;$$
$$x_2 = \frac{13,7 - 13,6518}{14,64} = \frac{0,0482}{14,64} = 0,00329$$

$$15.- 3,09x^2 - 0,071x - 0,0943 = 0$$

Solución:

$$3,09x^2 - 0,071x - 0,0943 = 0 \Rightarrow x = \frac{0,071 \pm \sqrt{(0,071)^2 + 4(3,09)(0,0943)}}{6,18} \Rightarrow$$

$$\Rightarrow x = \frac{0,071 \pm \sqrt{0,005041 + 1,165548}}{6,18} = \frac{0,071 \pm \sqrt{1,170589}}{6,18} = \frac{0,071 \pm 1,0819}{6,18} \Rightarrow$$

$$\Rightarrow x_1 = \frac{0,071 + 1,0819}{6,18} = \frac{1,15293}{6,18} = 0,186559$$

$$x_2 = \frac{0,071 - 1,0819}{6,18} = -\frac{1,0109}{6,18} = -0,16357$$

16.- $6,0066x^2 + 11,051x + 2,003 = 0$

Solución:

$$6,0066x^2 + 11,051x + 2,003 = 0 \Rightarrow x = \frac{-11,051 \pm \sqrt{(11,051)^2 - 4(6,0066)(2,003)}}{12,0132} \Rightarrow$$

$$\Rightarrow x = \frac{-11,051 \pm \sqrt{122,1246 - 48,120072}}{12,0132} = \frac{-11,051 \pm \sqrt{74,004528}}{12,0132} = \frac{-11,051 \pm 8,602588}{12,0132} \Rightarrow$$

$$\Rightarrow x_1 = \frac{-2,44841}{12,0132} = -0,20381; x_2 = -\frac{19,653588}{12,0132} = -1,63086$$

17.- $7,43 \cdot 10^{56} x^2 - 1,598 \cdot 10^{57} x + 8,45 \cdot 10^{55} = 0$

Solución:

$$7,43 \cdot 10^{56} x^2 - 1,598 \cdot 10^{57} x + 8,45 \cdot 10^{55} = 0 \Rightarrow$$

$$\Rightarrow x = \frac{1,598 \cdot 10^{57} \pm \sqrt{(1,598 \cdot 10^{57})^2 - 4(7,43 \cdot 10^{56})(8,45 \cdot 10^{55})}}{2(7,43 \cdot 10^{56})} \Rightarrow$$

$$\Rightarrow x = \frac{1,598 \cdot 10^{57} \pm \sqrt{2,5536 \cdot 10^{114} - 251 \cdot 10^{111}}}{14,86 \cdot 10^{56}} = \frac{1,598 \cdot 10^{57} \pm \sqrt{(2,5536 - 0,251) \cdot 10^{114}}}{14,86 \cdot 10^{56}} \Rightarrow$$

$$\Rightarrow x = \frac{1,598 \cdot 10^{57} \pm \sqrt{2,3026 \cdot 10^{114}}}{14,86 \cdot 10^{56}} = \frac{1,598 \cdot 10^{57} \pm 1,5174 \cdot 10^{57}}{14,86 \cdot 10^{56}} \Rightarrow$$

$$\Rightarrow x_1 = \frac{30,772 \cdot 10^{56}}{14,86 \cdot 10^{56}} = 2,07079; x_2 = \frac{0,424 \cdot 10^{56}}{14,86 \cdot 10^{56}} = 0,0285329$$

18.- $4,437 \cdot 10^{-72} x^2 + 5,904 \cdot 10^{-70} x - 8,127 \cdot 10^{-71} = 0$

Solución:

$$4,437 \cdot 10^{-72} x^2 + 5,904 \cdot 10^{-70} x - 8,127 \cdot 10^{-71} = 0 \Rightarrow$$

$$\Rightarrow x = \frac{-5,904 \cdot 10^{-70} \pm \sqrt{(5,904 \cdot 10^{-70})^2 + 4(4,437 \cdot 10^{-72})(8,127 \cdot 10^{-71})}}{2(4,437 \cdot 10^{-72})} \Rightarrow$$

$$\Rightarrow x = \frac{-5,904 \cdot 10^{-70} \pm \sqrt{(34,857 \cdot 10^{-140}) + 144,2379 \cdot 10^{-143}}}{8,934 \cdot 10^{-72}} \Rightarrow$$

$$\Rightarrow x = \frac{-5,904 \cdot 10^{-70} \pm \sqrt{(34,857 + 0,14423779) \cdot 10^{-140}}}{8,934 \cdot 10^{-72}} \Rightarrow$$

$$\Rightarrow x = \frac{-5,904 \cdot 10^{-70} \pm 10^{-70} \cdot \sqrt{35,00123}}{8,934 \cdot 10^{-72}} = \frac{-5,904 \pm 5,9161}{8,934 \cdot 10^{-2}} \Rightarrow$$

$$\Rightarrow x_1 = \frac{0,0121}{8,934} \cdot 10^2 = 0,13; x_2 = -\frac{11,8201}{8,934} \cdot 10^2 = -132,3$$

EJERCICIO # 48. (Ecuaciones literales)

1.- $x^2 + ax - 6a^2 = 0$

Solución:

$$x^2 + ax - 6a^2 = 0 \Rightarrow x = \frac{-a \pm \sqrt{a^2 + 4(6a^2)}}{2} = \frac{-a \pm \sqrt{25a^2}}{2} = \frac{-a \pm 5a}{2} \Rightarrow$$

$$\Rightarrow x_1 = \frac{4a}{2} = 2a; x_2 = -\frac{6a}{2} = -3a$$

2.- $x^2 - 2ax - 8a^2 = 0$

Solución:

$$x^2 - 2ax - 8a^2 = 0 \Rightarrow x = \frac{2a \pm \sqrt{(2a)^2 + 4(8a^2)}}{2} = \frac{2a \pm \sqrt{36a^2}}{2} = \frac{2a \pm 6a}{2} \Rightarrow$$

$$\Rightarrow x_1 = \frac{8a}{2} = 4a; x_2 = -\frac{4a}{2} = -2a$$

3.- $ax^2 - (a^2 + 1)x + a = 0$

Solución:

$$ax^2 - (a^2 + 1)x + a = 0 \Rightarrow x = \frac{(a^2 + 1) \pm \sqrt{(a^2 + 1)^2 - 4(a)(a)}}{2a} \Rightarrow$$

$$\Rightarrow x = \frac{(a^2 + 1) \pm \sqrt{(a^2 - 1)^2}}{2a} = \frac{(a^2 + 1) \pm (a^2 - 1)}{2a} \Rightarrow$$

$$\Rightarrow x_1 = \frac{2a^2}{2a} = a; x_2 = \frac{2}{2a} = \frac{1}{a}$$

4.- $3ax^2 - (6a^2 - 1)x - 2a = 0$

Solución:

$$3ax^2 - (6a^2 - 1)x - 2a = 0 \Rightarrow x = \frac{(6a^2 - 1) \pm \sqrt{(6a^2 - 1)^2 + 4(3a)(2a)}}{6a} \Rightarrow$$

$$\Rightarrow x = \frac{(6a^2 - 1) \pm \sqrt{(6a^2 + 1)^2}}{6a} = \frac{(6a^2 - 1) \pm (6a^2 + 1)}{6a} \Rightarrow$$

$$\Rightarrow x_1 = \frac{12a^2}{6a} = 2a; x_2 = \frac{-2}{6a} = -\frac{1}{3a}$$

5.- $ax^2 + (2a^2 + 3)x + 6a = 0$

Solución:

$$ax^2 + (2a^2 + 3)x + 6a = 0 \Rightarrow x = \frac{-(2a^2 + 3) \pm \sqrt{(2a^2 + 3)^2 - 4(a)(6a)}}{2a} \Rightarrow$$

$$\Rightarrow x = \frac{-(2a^2 + 3) \pm \sqrt{(2a^2 - 3)^2}}{2a} = \frac{-(2a^2 + 3) \pm (2a^2 - 3)}{2a} \Rightarrow$$

$$\Rightarrow x_1 = -\frac{6}{2a} = -\frac{3}{a}; x_2 = -\frac{4a^2}{2a} = -2a$$

6.- $4x^2 - 5ax + 6a^2 = 0$

Solución:

$$4x^2 - 5ax - 6a^2 = 0 \Rightarrow x = \frac{5a \pm \sqrt{(5a)^2 + 4(4)(6a^2)}}{8} \Rightarrow$$

$$\Rightarrow x = \frac{5a \pm \sqrt{121a^2}}{8} = \frac{5a \pm 11a}{8} \Rightarrow x_1 = \frac{16a}{8} = 2a; x_2 = -\frac{6a}{8} = -\frac{3a}{4}$$

$$7.- 2x^2 + 7\sqrt{2}ax + 6a^2 = 0$$

Solución:

$$\begin{aligned} 2x^2 + 7\sqrt{2}ax + 6a^2 = 0 &\Rightarrow x = \frac{-7\sqrt{2}a \pm \sqrt{(7\sqrt{2}a)^2 - 4(2)(6a^2)}}{4} \Rightarrow \\ &\Rightarrow x = \frac{-7\sqrt{2}a \pm \sqrt{98a^2 - 48a^2}}{4} = \frac{-7\sqrt{2}a \pm 5\sqrt{2}a}{4} \Rightarrow \\ &\Rightarrow x_1 = \frac{-2\sqrt{2}a}{4} = -\frac{\sqrt{2}a}{2}; x_2 = -\frac{12\sqrt{2}a}{4} = -3\sqrt{2}a \end{aligned}$$

$$8.- (x-a)^2 + 2a = x + a^2$$

Solución:

$$\begin{aligned} (x-a)^2 + 2a = x + a^2 &\Rightarrow x^2 - 2ax + a^2 + 2a = x + a^2 \Rightarrow \\ &\Rightarrow x^2 - (2a+1)x + 2a = 0 \Rightarrow x = \frac{(2a+1) \pm \sqrt{(2a+1)^2 - 4(2a)}}{2} \Rightarrow \\ &\Rightarrow x = \frac{(2a+1) \pm \sqrt{(2a-1)^2}}{2} = \frac{(2a+1) \pm (2a-1)}{2} \Rightarrow \\ &\Rightarrow x_1 = \frac{4a}{2} = 2a; x_2 = \frac{2}{2} = 1 \end{aligned}$$

$$9.- 3x^2 - a = (1-2a)x + a^2$$

Solución:

$$\begin{aligned} 3x^2 - a = (1-2a)x + a^2 &\Rightarrow 3x^2 - (1-2a)x - a(a+1) = 0 \Rightarrow \\ &\Rightarrow x = \frac{(1-2a) \pm \sqrt{(1-2a)^2 + 4(3)[a(a+1)]}}{6} \Rightarrow \\ &\Rightarrow x = \frac{(1-2a) \pm \sqrt{1-4a+4a^2+12a^2+12a}}{6} \Rightarrow \\ &\Rightarrow x = \frac{(1-2a) \pm \sqrt{1+8a+16a^2}}{6} = \frac{(1-2a) \pm \sqrt{(1+4a)^2}}{6} \Rightarrow \\ &\Rightarrow x = \frac{(1-2a) \pm (1+4a)}{6} \Rightarrow x_1 = \frac{2+2a}{6} = \frac{1+a}{3}; x_2 = -\frac{6a}{6} = -a \end{aligned}$$

$$10.- (2a+1)x^2 - 4ax + (2a-1) = 0$$

Solución:

$$(2a+1)x^2 - 4ax + (2a-1) = 0 \Rightarrow$$

$$\Rightarrow x = \frac{4a \pm \sqrt{(4a)^2 - 4(2a+1)(2a-1)}}{2(2a+1)} = \frac{4a \pm \sqrt{16a^2 - 4(4a^2 - 1)}}{2(2a+1)} \Rightarrow$$

$$\Rightarrow x = \frac{4a \pm 2}{4a+2} \Rightarrow x_1 = \frac{4a+2}{4a+2} = 1; x_2 = \frac{4a-2}{2(2a+1)} = \frac{2a-1}{2a+1}$$

$$11.- x^2 - 2ax + a^2 - b^2 = 0$$

Solución:

$$x^2 - 2ax + a^2 - b^2 = 0 \Rightarrow x = \frac{2a \pm \sqrt{(2a)^2 - 4(a^2 - b^2)}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{2a \pm \sqrt{4b^2}}{2} = a \pm b \Rightarrow x_1 = a + b; x_2 = a - b$$

$$12.- x^2 + 9a^2 = 6ax + b^2$$

Solución:

$$x^2 + 9a^2 = 6ax + b^2 \Rightarrow x^2 - 6ax + 9a^2 - b^2 = 0 \Rightarrow$$

$$\Rightarrow x = \frac{6a \pm \sqrt{(6a)^2 - 4(9a^2 - b^2)}}{2} = \frac{6a \pm 2b}{2} = 3a \pm b \Rightarrow$$

$$\Rightarrow x_1 = 3a + b; x_2 = 3a - b$$

$$13.- x^2 - 6bx - a^2 + 9b^2 = 0$$

Solución:

$$x^2 - 6bx - a^2 + 9b^2 = 0 \Rightarrow x^2 - 6bx - (a^2 - 9b^2) = 0 \Rightarrow$$

$$\Rightarrow x = \frac{6b \pm \sqrt{(6b)^2 + 4(a^2 - 9b^2)}}{2} = \frac{6b \pm \sqrt{4a^2}}{2} = \frac{6b \pm 2a}{2} \Rightarrow$$

$$\Rightarrow x = 3b \pm a \Rightarrow x_1 = 3b + a; x_2 = 3b - a$$

$$14.- (a^2 - b^2)x^2 - 2ax + 1 = 0$$

Solución:

$$(a^2 - b^2)x^2 - 2ax + 1 = 0 \Rightarrow x = \frac{2a \pm \sqrt{(2a)^2 - 4(a^2 - b^2)}}{(2)(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x = \frac{2a \pm 2b}{2(a^2 - b^2)} = \frac{a \pm b}{a^2 - b^2} \Rightarrow x_1 = \frac{a+b}{a^2 - b^2} = \frac{1}{a-b}; x_2 = \frac{a-b}{a^2 - b^2} = \frac{1}{a+b}$$

15.- $x^2 - 3(a-2b)x - 18ab = 0$

Solución:

$$x^2 - 3(a-2b)x - 18ab = 0 \Rightarrow x = \frac{3(a-2b) \pm \sqrt{[3(a-2b)]^2 + 4(18ab)}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{3(a-2b) \pm \sqrt{9(a-2b)^2 + 72ab}}{2} = \frac{(a-2b) \pm \sqrt{9(a+2b)^2}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{3(a-2b) \pm 3(a+2b)}{2} \Rightarrow x_1 = \frac{6a}{2} = 3a; x_2 = -\frac{12b}{2} = -6b$$

16.- $\sqrt{3}x^2 - 7ax + 2\sqrt{3}a^2 = 0$

Solución:

$$\sqrt{3}x^2 - 7ax + 2\sqrt{3}a^2 = 0 \Rightarrow x = \frac{7a \pm \sqrt{(7a)^2 - 4(\sqrt{3})(2\sqrt{3}a^2)}}{2\sqrt{3}} \Rightarrow$$

$$\Rightarrow x = \frac{7a \pm \sqrt{49a^2 - 24a^2}}{2\sqrt{3}} = \frac{7a \pm 5a}{2\sqrt{3}} \Rightarrow$$

$$x_1 = \frac{12a}{2\sqrt{3}} = \frac{6a}{\sqrt{3}} = \frac{6\sqrt{3}a}{3} = 2\sqrt{3}a; x_2 = \frac{2a}{2\sqrt{3}} = \frac{a}{\sqrt{3}} = \frac{\sqrt{3}a}{3}$$

17.- $x(x+a) = bx + ab$

Solución:

$$x(x+a) = bx + ab \Rightarrow x^2 + (a-b)x - ab = 0 \Rightarrow$$

$$\Rightarrow x = \frac{-(a-b) \pm \sqrt{(a-b)^2 + 4(ab)}}{2} = \frac{(b-a) \pm \sqrt{(a+b)^2}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{(b-a) \pm (a+b)}{2} \Rightarrow x_1 = \frac{2b}{2} = b; x_2 = -\frac{2a}{2} = -a$$

18.- $x^2 - ax = bx - ab$

Solución:

$$x^2 - ax = bx - ab \Rightarrow x^2 - (a+b)x + ab = 0 \Rightarrow$$

$$\Rightarrow x = \frac{(a+b) \pm \sqrt{(a+b)^2 - 4(ab)}}{2} = \frac{(a+b) \pm \sqrt{(a-b)^2}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{(a+b) \pm (a-b)}{2} \Rightarrow x_1 = \frac{2a}{2} = a; x_2 = \frac{2b}{2} = b$$

19.- $(a^2 - b^2)x^2 - 2(a^2 + b^2)x + (a^2 - b^2) = 0$

Solución:

$$(a^2 - b^2)x^2 - 2(a^2 + b^2)x + (a^2 - b^2) = 0 \Rightarrow$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm \sqrt{[2(a^2 + b^2)]^2 - 4(a^2 - b^2)(a^2 - b^2)}}{2(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm \sqrt{4a^4 + 8a^2b^2 + 4b^4 - 4(a^4 - 2a^2b^2 + b^4)}}{2(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm \sqrt{16a^2b^2}}{2(a^2 - b^2)} = \frac{2(a^2 + b^2) \pm 4ab}{2(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x_1 = \frac{2(a^2 + b^2 + 2ab)}{2(a^2 - b^2)} = \frac{(a+b)^2}{(a-b)(a+b)} = \frac{a+b}{a-b};$$

$$x_2 = \frac{2(a^2 + b^2 - 2ab)}{2(a^2 - b^2)} = \frac{(a-b)^2}{(a-b)(a+b)} = \frac{a-b}{a+b}$$

20.- $(a-b)^2 x^2 + 2(a^2 + b^2)x + (a+b)^2 = 0$

Solución:

$$\begin{aligned}
 (a-b)^2 x^2 + 2(a^2 + b^2)x + (a+b)^2 &= 0 \Rightarrow \\
 \Rightarrow x &= \frac{-2(a^2 + b^2) \pm \sqrt{[2(a^2 + b^2)]^2 - 4[(a-b)(a+b)]^2}}{2(a-b)^2} \Rightarrow \\
 \Rightarrow x &= \frac{-2(a^2 + b^2) \pm \sqrt{4(a^4 + 2a^2b^2 + b^4) - 4(a^4 - 2a^2b^2 + b^4)}}{2(a-b)^2} \Rightarrow \\
 \Rightarrow x &= \frac{-2(a^2 + b^2) \pm \sqrt{16a^2b^2}}{2(a-b)^2} = \frac{-2(a^2 + b^2) \pm 4ab}{2(a-b)^2} \Rightarrow \\
 \Rightarrow \frac{-(a^2 + b^2) \pm 2ab}{(a-b)^2} &\Rightarrow x_1 = -\frac{(a-b)^2}{(a-b)^2} = -1; x_2 = -\frac{(a+b)^2}{(a-b)^2}
 \end{aligned}$$

21.- $(x-a)(x+b) = -ab$

Solución:

$$\begin{aligned}
 (x-a)(x+b) &= -ab \Rightarrow x^2 - (a-b)x - ab + ab = 0 \Rightarrow \\
 \Rightarrow x^2 - (a-b)x &= 0 \Rightarrow x[x - (a-b)] = 0 \Rightarrow x_1 = 0; x_2 = a-b
 \end{aligned}$$

Si aplicamos la resolvente:

$$x = \frac{(a-b) \pm \sqrt{(a-b)^2}}{2} \Rightarrow \frac{(a-b) \pm (a-b)}{2} \Rightarrow x_1 = 0; x_2 = \frac{2(a-b)}{2} = a-b$$

22.- $(a-b)x^2 - (a+b)x = 0$

Solución:

$$\begin{aligned}
 (a-b)x^2 - (a+b)x &= 0 \Rightarrow x = \frac{(a+b) \pm \sqrt{(a+b)^2}}{2(a-b)} \Rightarrow \\
 \Rightarrow x &= \frac{(a+b) \pm (a+b)}{2(a-b)} \Rightarrow x_1 = \frac{2(a+b)}{2(a-b)} = \frac{a+b}{a-b}; x_2 = 0
 \end{aligned}$$

23.- $\frac{x}{a} - \frac{x}{b} = \frac{b-a}{x}$

Solución:

$$\begin{aligned} \frac{x}{a} - \frac{x}{b} &= \frac{b-a}{x} \Rightarrow (abx) \left[\frac{x}{a} - \frac{x}{b} \right] = (abx) \left(\frac{b-a}{x} \right) \Rightarrow \\ \Rightarrow bx^2 - ax^2 &= ab(b-a) \Rightarrow (b-a)x^2 = ab(b-a) \Rightarrow \\ \Rightarrow x^2 &= ab \Rightarrow x = \pm\sqrt{ab} \Rightarrow x_1 = \sqrt{ab}; x_2 = -\sqrt{ab} \end{aligned}$$

24.- $\frac{x}{a+b} - \frac{a+b}{(a-b)^2 x} = 0$

Solución:

$$\begin{aligned} \frac{x}{a+b} - \frac{a+b}{(a-b)^2 x} = 0 \Rightarrow \frac{x}{a+b} &= \frac{a+b}{(a-b)^2 x} \Rightarrow (a-b)^2 x^2 = (a+b)^2 \Rightarrow \\ x = \pm \frac{a+b}{a-b} \Rightarrow x_1 &= \frac{a+b}{a-b}; x_2 = -\frac{a+b}{a-b} \end{aligned}$$

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

Solución:

$$\begin{aligned} \frac{x+a}{x-a} + \frac{x-a}{x+a} &= \frac{2(1+a^2)}{1-a^2} \Rightarrow \frac{(x+a)^2 + (x-a)^2}{x^2 - a^2} = \frac{2(1+a^2)}{1-a^2} \Rightarrow \\ \Rightarrow \frac{2(x^2 + a^2)}{x^2 - a^2} &= \frac{2(1+a^2)}{1-a^2} \Rightarrow (x^2 + a^2)(1-a^2) = (x^2 - a^2)(1+a^2) \Rightarrow \\ \Rightarrow x^2 [(1-a^2) - (1+a^2)] &+ a^2 [(1-a^2) + (1+a^2)] = 0 \Rightarrow \\ \Rightarrow (-2a^2)x^2 + 2a^2 &= 0 \Rightarrow x = \pm 1 \end{aligned}$$

26.- $x^2 - \left(\frac{a-b}{a+b}\right)x = \left(\frac{a+b}{a-b}\right)x - 1$

Solución:

$$\begin{aligned} x^2 - \left(\frac{a-b}{a+b}\right)x &= \left(\frac{a+b}{a-b}\right)x - 1 \Rightarrow (a+b)(a-b) \left[x^2 - \left(\frac{a-b}{a+b}\right)x \right] = (a+b)(a-b) \left[\left(\frac{a+b}{a-b}\right)x - 1 \right] \Rightarrow \\ \Rightarrow (a^2 - b^2)x^2 - (a-b)^2 x &= (a+b)^2 x - (a^2 - b^2) \Rightarrow \\ \Rightarrow (a^2 - b^2)x^2 - [(a-b)^2 + (a+b)^2]x &+ (a^2 - b^2) = 0 \Rightarrow \\ \Rightarrow (a^2 - b^2)x^2 - 2(a^2 + b^2)x + (a^2 - b^2) &= 0 \Rightarrow \end{aligned}$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm \sqrt{[2(a^2 + b^2)]^2 - 4(a^2 - b^2)^2}}{2(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm \sqrt{4(a^2 + b^2)^2 - 4(a^2 - b^2)^2}}{2(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x = \frac{2(a^2 + b^2) \pm 4ab}{2(a^2 - b^2)} = \frac{(a^2 + b^2) \pm 2ab}{(a^2 - b^2)} \Rightarrow$$

$$\Rightarrow x_1 = \frac{(a+b)^2}{(a+b)(a-b)} = \frac{a+b}{a-b}; x_2 = \frac{(a-b)^2}{(a+b)(a-b)} = \frac{a-b}{a+b}$$

27.- $(a+b)bx^2 + a^2 = a(a+2b)x$

Solución:

$$(a+b)bx^2 + a^2 = a(a+2b)x \Rightarrow (a+b)bx^2 - a(a+2b)x + a^2 = 0 \Rightarrow$$

$$\Rightarrow x = \frac{a(a+2b) \pm \sqrt{[a(a+2b)]^2 - 4[(a+b)b(a^2)]}}{2(a+b)b} \Rightarrow$$

$$\Rightarrow x = \frac{a(a+2b) \pm \sqrt{a^2(a^2 + 4ab + 4b^2) - 4(a^3b + a^2b^2)}}{2(a+b)b} \Rightarrow$$

$$\Rightarrow x = \frac{a(a+2b) \pm a^2}{2(a+b)b} \Rightarrow x_1 = \frac{2ab}{2(a+b)b} = \frac{a}{a+b}; x_2 = \frac{2a^2 + 2ab}{2(a+b)b} = \frac{a(a+b)}{(a+b)b} = \frac{a}{b}$$

28.- $a^2 - x^2 = 4b(b-x)$

Solución:

$$a^2 - x^2 = 4b(b-x) \Rightarrow x^2 + 4b^2 - 4bx - a^2 = 0 \Rightarrow$$

$$\Rightarrow x^2 - 4bx - (a^2 - 4b^2) = 0 \Rightarrow x = \frac{4b \pm \sqrt{(4b)^2 + 4(a^2 - 4b^2)}}{2} \Rightarrow$$

$$\Rightarrow x = \frac{4b \pm \sqrt{4a^2}}{2} = \frac{4b \pm 2a}{2} \Rightarrow x_1 = 2b + a; x_2 = 2b - a$$

29.- $x^2 - 4bx = a^2 + 2ab - 3b^2$

Solución:

$$\begin{aligned}
 x^2 - 4bx &= a^2 + 2ab - 3b^2 \Rightarrow x^2 - 4bx = a^2 + 2ab + b^2 - 4b^2 \Rightarrow \\
 \Rightarrow x^2 - 4bx &= (a+b)^2 - 4b^2 \Rightarrow x^2 - 4bx - [(a+b)^2 - 4b^2] = 0 \Rightarrow \\
 \Rightarrow x &= \frac{4b \pm \sqrt{(4b)^2 + 4[(a+b)^2 - 4b^2]}}{2} = \frac{4b \pm \sqrt{4(a+b)^2}}{2} = \frac{4b \pm 2(a+b)}{2} \Rightarrow \\
 \Rightarrow x &= 2b \pm (a+b) \Rightarrow x_1 = a + 3b; x_2 = b - a
 \end{aligned}$$

30.- $x^2 + 8a^2 = b^2 - 2ab + 6ax$

Solución:

$$\begin{aligned}
 x^2 + 8a^2 &= b^2 - 2ab + 6ax \Rightarrow x^2 - 6ax = b^2 - 2ab + a^2 - 9a^2 \Rightarrow \\
 \Rightarrow x^2 - 6ax &= (b-a)^2 - 9a^2 \Rightarrow x^2 - 6ax - [(b-a)^2 - 9a^2] \Rightarrow \\
 \Rightarrow x &= \frac{6a \pm \sqrt{(6a)^2 + 4[(b-a)^2 - 9a^2]}}{2} = \frac{6a \pm \sqrt{4(b-a)^2}}{2} = 3a \pm (b-a) \Rightarrow \\
 \Rightarrow x &= 3a \pm (b-a) \Rightarrow x_1 = 2a + b; x_2 = 4a - b
 \end{aligned}$$

31.- $ab(x^2 - c^2) = (a^2 - b^2)cx$

Solución:

$$\begin{aligned}
 ab(x^2 - c^2) &= (a^2 - b^2)cx \Rightarrow abx^2 - (a^2 - b^2)cx - abc^2 = 0 \Rightarrow \\
 \Rightarrow x &= \frac{(a^2 - b^2)c \pm \sqrt{[(a^2 - b^2)c]^2 + 4(ab)(abc^2)}}{2ab} \Rightarrow \\
 \Rightarrow x &= \frac{(a^2 - b^2)c \pm \sqrt{(a^4 - 2a^2b^2 + b^4)c^2 + 4a^2b^2c^2}}{2ab} \Rightarrow \\
 \Rightarrow x &= \frac{(a^2 - b^2)c \pm \sqrt{(a^2 + b^2)^2 c^2}}{2ab} = \frac{(a^2 - b^2)c \pm (a^2 + b^2)c}{2ab} \Rightarrow \\
 \Rightarrow x_1 &= \frac{2a^2c}{2ab} = \frac{ac}{b}; x_2 = -\frac{2b^2c}{2ab} = -\frac{bc}{a}
 \end{aligned}$$

32.- $a^2c^2x^2 - 2ab^2cx + b^4 = 0$

Solución:

$$a^2c^2x^2 - 2ab^2cx + b^4 = 0 \Rightarrow x = \frac{2ab^2c \pm \sqrt{(2ab^2c)^2 - 4(a^2c^2)(b^4)}}{2(a^2c^2)} \Rightarrow$$

$$\Rightarrow x_{1,2} = \frac{2ab^2c}{2a^2c^2} = \frac{b^2}{ac}$$

$$33.- \frac{x-a}{x-b} + \frac{x-b}{x-a} + 2 = 0$$

Solución:

$$\frac{x-a}{x-b} + \frac{x-b}{x-a} + 2 = 0 \Rightarrow (x-a)(x-b) \left[\frac{x-a}{x-b} + \frac{x-b}{x-a} + 2 \right] = 0 \Rightarrow$$

$$\Rightarrow (x-a)^2 + (x-b)^2 + 2(x-a)(x-b) = 0 \Rightarrow$$

$$\Rightarrow [(x-a) + (x-b)]^2 = 0 \Rightarrow 2x - (a+b) = 0 \Rightarrow x_{1,2} = \frac{a+b}{2} \text{ (doble)}$$

$$34.- \frac{x+a}{x} + \frac{x}{x+a} = \frac{5}{2}$$

Solución:

$$\frac{x+a}{x} + \frac{x}{x+a} = \frac{5}{2} \Rightarrow 2x(x+a) \left[\frac{x+a}{x} + \frac{x}{x+a} \right] = 2x(x+a) \left(\frac{5}{2} \right) \Rightarrow$$

$$\Rightarrow 2(x+a)^2 + 2x^2 = 5x(x+a) \Rightarrow 2(x^2 + 2ax + a^2) + 2x^2 = 5x^2 + 5ax \Rightarrow$$

$$\Rightarrow x^2 + ax - 2a^2 = 0 \Rightarrow x = \frac{-a \pm \sqrt{a^2 + 4(2a^2)}}{2} = \frac{-a \pm 3a}{2} \Rightarrow x_1 = \frac{2a}{2} = a; x_2 = -\frac{4a}{2} = -2a$$

$$35.- \frac{x+a+2b}{x+a-2b} = \frac{b-2a+2x}{b+2a-2x}$$

Solución:

$$\begin{aligned} \frac{x+a+2b}{x+a-2b} &= \frac{b-2a+2x}{b+2a-2x} \Rightarrow (x+a+2b)(b+2a-2x) = (x+a-2b)(b-2a+2x) \Rightarrow \\ &\Rightarrow (bx+2ax-2x^2) + (ab+2a^2-2ax) + (2b^2+4ab-4bx) = \\ &= (xb-2ax+2x^2) + (ab-2a^2+2ax) + (-2b^2+4ab-4bx) \Rightarrow \\ &\Rightarrow -2x^2-3bx+5ab+2(a^2+b^2) = 2x^2-3bx+5ab-2(a^2+b^2) \Rightarrow \\ &\Rightarrow 4x^2-4(a^2+b^2) = 0 \Rightarrow x^2 = a^2+b^2 \Rightarrow x_{1,2} = \pm\sqrt{a^2+b^2} \end{aligned}$$

36.- $(x+a^2-b^2)^2 = 4a^2x$

Solución:

$$\begin{aligned} (x+a^2-b^2)^2 &= 4a^2x \Rightarrow [x+(a^2-b^2)]^2 = 4a^2x \Rightarrow \\ &\Rightarrow x^2+2(x)(a^2-b^2)+(a^2-b^2)^2 = 4a^2x \Rightarrow \\ &\Rightarrow x^2-2x(a^2+b^2)+(a^2-b^2)^2 = 0 \Rightarrow \\ &\Rightarrow x = \frac{2(a^2+b^2) \pm \sqrt{4(a^2+b^2)^2 - 4(a^2-b^2)^2}}{2} \Rightarrow \\ &\Rightarrow x = \frac{2(a^2+b^2) \pm \sqrt{16a^2b^2}}{2} = (a^2+b^2) \pm 2ab \Rightarrow \\ &\Rightarrow x_1 = (a+b)^2; x_2 = (a-b)^2 \end{aligned}$$

37.- $\frac{x-a}{a-1} - \frac{x+a}{a+1} = \frac{x^2-1}{1-a^2}$

Solución:

$$\begin{aligned} \frac{x-a}{a-1} - \frac{x+a}{a+1} &= \frac{x^2-1}{1-a^2} \Rightarrow (a^2-1) \left[\frac{x-a}{a-1} - \frac{x+a}{a+1} \right] = (a^2-1) \left(\frac{x^2-1}{1-a^2} \right) \Rightarrow \\ &\Rightarrow (a+1)(x-a) - (a-1)(x+a) = 1-x^2 \Rightarrow \\ &\Rightarrow ax - a^2 + x - a - (ax + a^2 - x - a) = 1-x^2 \Rightarrow \\ &\Rightarrow x^2 + 2x - (2a^2 + 1) = 0 \Rightarrow x = \frac{-2 \pm \sqrt{(2)^2 + 4(2a^2 + 1)}}{2} = \frac{-2 \pm 2\sqrt{1+2a^2+1}}{2} \Rightarrow \\ &\Rightarrow x = -1 \pm \sqrt{2a^2 + 2} \end{aligned}$$

$$38.- \frac{x+\sqrt{a}}{x-2\sqrt{a}} + \frac{x+2\sqrt{a}}{x-\sqrt{a}} = \frac{4ax}{x^2-3\sqrt{a}x+2a}$$

Solución:

$$\begin{aligned} \frac{x+\sqrt{a}}{x-2\sqrt{a}} + \frac{x+2\sqrt{a}}{x-\sqrt{a}} &= \frac{4ax}{x^2-3\sqrt{a}x+2a} \Rightarrow \\ \frac{x+\sqrt{a}}{x-2\sqrt{a}} + \frac{x+2\sqrt{a}}{x-\sqrt{a}} &= \frac{4ax}{(x-\sqrt{a})(x-2\sqrt{a})} \Rightarrow \\ (x-\sqrt{a})(x-2\sqrt{a}) \left[\frac{x+\sqrt{a}}{x-2\sqrt{a}} - \frac{x+2\sqrt{a}}{x-\sqrt{a}} \right] &= (x-\sqrt{a})(x-2\sqrt{a}) \left[\frac{4ax}{(x-\sqrt{a})(x-2\sqrt{a})} \right] \Rightarrow \\ \Rightarrow (x-\sqrt{a})(x+\sqrt{a}) - (x-2\sqrt{a})(x+2\sqrt{a}) &= 4ax \Rightarrow (x^2-a) + (x^2-4a) = 4ax \Rightarrow \\ \Rightarrow 2x^2 - 4ax - 5a = 0 \Rightarrow x &= \frac{4a \pm \sqrt{16a^2 + 4(2)(5a)}}{4} \Rightarrow x = \frac{2a \pm \sqrt{4a^2 + 10a}}{2} \end{aligned}$$

$$39.- 9x^2 - 6\sqrt{a}x + a + 3b^2 = 0$$

Solución:

$$\begin{aligned} 9x^2 - 6\sqrt{a}x + a + 3b^2 = 0 \Rightarrow x &= \frac{6\sqrt{a} \pm \sqrt{36a - 4(9)(a + 3b^2)}}{18} \Rightarrow \\ \Rightarrow x &= \frac{6\sqrt{a} \pm \sqrt{-108b^2}}{18} \end{aligned}$$

NO TIENE RAICES REALES.

$$40.- \frac{x^2}{a+b} + \frac{2ab}{a+b} = \sqrt{2}x$$

Solución:

$$\begin{aligned} \frac{x^2}{a+b} + \frac{2ab}{a+b} &= \sqrt{2}x \Rightarrow x^2 + 2ab = \sqrt{2}(a+b)x \Rightarrow x^2 - \sqrt{2}(a+b)x + 2ab = 0 \Rightarrow \\ \Rightarrow x &= \frac{\sqrt{2}(a+b) \pm \sqrt{2(a+b)^2 - 4(2ab)}}{2} \Rightarrow \\ \Rightarrow x &= \frac{\sqrt{2}(a+b) \pm \sqrt{2(a-b)^2}}{2} = \frac{\sqrt{2}(a+b) \pm \sqrt{2}(a-b)}{2} \Rightarrow \\ \Rightarrow x_1 &= \frac{2\sqrt{2}a}{2} = \sqrt{2}a; x_2 = \frac{2\sqrt{2}b}{2} = \sqrt{2}b \end{aligned}$$

$$41.- \frac{1}{x} - \frac{3}{2a} = \frac{1}{a-x}$$

Solución:

$$\begin{aligned} \frac{1}{x} - \frac{3}{2a} = \frac{1}{a-x} &\Rightarrow 2ax(a-x) \left[\frac{1}{x} - \frac{3}{2a} \right] = 2ax(a-x) \left(\frac{1}{a-x} \right) \Rightarrow \\ \Rightarrow 2a(a-x) - 3x(a-x) &= 2ax \Rightarrow 2a^2 - 2ax - 3ax + 3x^2 = 2ax \Rightarrow \\ \Rightarrow 3x^2 - 7ax + 2a^2 &= 0 \Rightarrow x = \frac{7a \pm \sqrt{(7a)^2 - 4(3)(2a^2)}}{6} = \frac{7a \pm 5a}{6} \Rightarrow \\ \Rightarrow x_1 = \frac{12a}{6} = 2a; x_2 &= \frac{2a}{6} = \frac{a}{3} \end{aligned}$$

$$42.- \frac{1}{x+a} - \frac{1}{2} = \frac{1}{a-x}$$

Solución:

$$\begin{aligned} \frac{1}{x+a} - \frac{1}{2} = \frac{1}{a-x} &\Rightarrow 2(a^2 - x^2) \left[\frac{1}{x+a} - \frac{1}{2} \right] = 2(a^2 - x^2) \left(\frac{1}{a-x} \right) \Rightarrow \\ \Rightarrow 2(a-x) - (a^2 - x^2) &= 2(a+x) \Rightarrow 2a - 2x - a^2 + x^2 = 2a + 2x \Rightarrow \\ \Rightarrow x^2 - 4x - a^2 &= 0 \Rightarrow x = \frac{4 \pm \sqrt{16 + 4a^2}}{2} = 2 \pm 2\sqrt{4 + a^2} \Rightarrow \\ \Rightarrow x_1 = 2 + \sqrt{4 + a^2}; x_2 &= 2 - \sqrt{4 + a^2} \end{aligned}$$

$$43.- \frac{x^2 + x + 1}{3a^2 + b^2} = \frac{x^2 - x + 1}{a^2 + 3b^2}$$

Solución:

$$\begin{aligned} \frac{x^2+x+1}{3a^2+b^2} &= \frac{x^2-x+1}{a^2+3b^2} \Rightarrow (x^2+x+1)(3a^2+b^2) = (x^2-x+1)(a^2+3b^2) \Rightarrow 444 \\ &\Rightarrow (3a^2+b^2)x^2 + (3a^2+b^2)x + (3a^2+b^2) = (a^2+3b^2)x^2 - (a^2+3b^2)x + (a^2+3b^2) \Rightarrow \\ &\Rightarrow 2(a^2-b^2)x^2 + 4(a^2+b^2)x + 2(a^2-b^2) = 0 \\ &\Rightarrow x = \frac{4(a^2+b^2) \pm \sqrt{[4(a^2+b^2)]^2 - 4[2(a^2-b^2)]^2}}{4(a^2-b^2)} \Rightarrow \\ &\Rightarrow x = \frac{4(a^2+b^2) \pm \sqrt{64a^2b^2}}{4(a^2-b^2)} = \frac{4(a^2+b^2) \pm 8ab}{4(a^2-b^2)} = \frac{(a^2+b^2) \pm 2ab}{(a^2-b^2)} \Rightarrow \\ &\Rightarrow x_1 = \frac{(a+b)^2}{(a+b)(a-b)} = \left(\frac{a+b}{a-b}\right); x_2 = \frac{(a-b)^2}{(a+b)(a-b)} = \frac{a-b}{a+b} \end{aligned}$$

$$44.- \frac{x^2-x+1}{a-1} = \frac{x^2+x+1}{a+1}$$

Solución:

$$\begin{aligned} \frac{x^2-x+1}{a-1} &= \frac{x^2+x+1}{a+1} \Rightarrow (x^2-x+1)(a+1) = (x^2+x+1)(a-1) \Rightarrow \\ &\Rightarrow (a+1)x^2 - (a+1)x + (a+1) = (a-1)x^2 + (a-1)x + (a-1) \Rightarrow \\ &\Rightarrow 2x^2 - 2ax + 2 = 0 \Rightarrow x^2 - ax + 1 = 0 \Rightarrow x = \frac{a \pm \sqrt{a^2-4}}{2} \end{aligned}$$

$$45.- \frac{x+\sqrt{ab}}{(x-a)(x-b)} = \frac{\sqrt{ab}}{ab}$$

Solución:

$$\begin{aligned} \frac{x+\sqrt{ab}}{(x-a)(x-b)} &= \frac{\sqrt{ab}}{ab} \Rightarrow (x+\sqrt{ab})(ab) = (x-a)(x-b)(\sqrt{ab}) \Rightarrow \\ &\Rightarrow abx + ab\sqrt{ab} = [x^2 - (a+b)x + ab]\sqrt{ab} \Rightarrow \\ &\Rightarrow abx = [x^2 - (a+b)x]\sqrt{ab} \Rightarrow \sqrt{ab}x = x^2 - (a+b)x \Rightarrow \\ &\Rightarrow x[x - (a+b + \sqrt{ab})] \Rightarrow x_1 = 0; x_2 = a+b + \sqrt{ab} \end{aligned}$$