24. $(2^{x+3})^{x-4}=1$

$(2^{x+3})^{x-4}=2^0 \Rightarrow (x+3)(x-4)=0 \Rightarrow \boxed{x=-3;\ x=4}$

25. $(2e^x+3)(e^{2x-5}-1)=0$

$2e^x+3=0 \Rightarrow e^x=-\frac{3}{2}$ *impossibile*

$e^{2x-5}-1= \Rightarrow e^{2x-5}=e^0 \Rightarrow 2x-5=0 \Rightarrow \boxed{x=\frac{5}{2}}$

26. $\left(\frac{1}{5}\right)^{|x+4|}=5^{2x}$

$5^{-|x+4|}=5^{2x} \Rightarrow -|x+4|=2x \Rightarrow$

$$\begin{cases} x \geq -4 \\ -x-4=2x \end{cases} \Rightarrow \begin{cases} x \geq -4 \\ x=-\frac{4}{3} \end{cases} \Rightarrow \boxed{x=-\frac{4}{3}}$$

$$\begin{cases} x<-4 \\ x+4=2x \end{cases} \Rightarrow \begin{cases} x<-4 \\ x=4 \end{cases} \quad imp.$$

27. $|2^{x+1}-1|=7$

$2^{x+1}-1=7 \Rightarrow 2^{x+1}=8 \Rightarrow 2^{x+1}=2^3 \Rightarrow x+1=3 \Rightarrow \boxed{x=2}$

$2^{x+1}-1=-7 \Rightarrow 2^{x+1}=-6 \Rightarrow imp.$

28. $\frac{5\cdot 4^{x-2}}{4^x-11}=1$

Pongo: $4^x=t \Rightarrow \frac{5\cdot t\cdot 4^{-2}}{t-11}=1 \Rightarrow \frac{5}{16}t=t-11 \quad c.a.: t\neq 11$

$-\frac{11}{16}t=-11 \Rightarrow t=16 \Rightarrow 4^x=16 \Rightarrow 4^x=4^2 \Rightarrow \boxed{x=2}$

29. $4^{\sqrt{|x+2|}}=16$

$4^{\sqrt{|x+2|}}=4^2 \Rightarrow \sqrt{|x+2|}=2 \Rightarrow |x+2|=4$

$x+2=4 \Rightarrow \boxed{x=2}$

$x+2=-4 \Rightarrow \boxed{x=-6}$

30. $2^{2-x} - 2^{3-x} + 2^x = 0$

$\frac{2^2}{2^x} - \frac{2^3}{2^x} + 2^x = 0$

Pongo: $2^x = t \quad \frac{4}{t} - \frac{8}{t} + t = 0 \Rightarrow t^2 - 4 = 0 \Rightarrow t = \pm 2$

$t = 2 \Rightarrow 2^x = 2^1 \Rightarrow x = 1$

$t = -2 \Rightarrow 2^x = -2$ *imp.*

31. $2^{2x+1} - 17 \cdot 2^x + 8 = 0$

$(2^x)^2 \cdot 2^1 - 17 \cdot 2^x + 8 = 0$

Pongo: $2^x = t \quad 2t^2 - 17t + 8 = 0$

$t_{1,2} = \frac{17 \pm \sqrt{289 - 64}}{4} = \begin{cases} 8 \\ \frac{1}{2} \end{cases}$

$t = 8 \Rightarrow 2^x = 8 \Rightarrow 2^x = 2^3 \Rightarrow x = 3$

$t = \frac{1}{2} \Rightarrow t = 2^{-1} \Rightarrow 2^x = 2^{-1} \Rightarrow x = -1$

32. $27^{\frac{5x^2-3}{x^2+1}} = 27^{\frac{5-x^2}{3x^2+1}}$

$\frac{5x^2 - 3}{x^2 + 1} = \frac{5 - x^2}{3x^2 + 1} \Rightarrow 15x^4 + 5x^2 - 9x^2 - 3 = 5x^2 + 5 - x^4 - x^2$

$16x^4 - 8x^2 - 8 = 0 \Rightarrow 2x^4 - x^2 - 1 = 0 \qquad pongo\ x^2 = t$

$2t^2 - t - 1 = 0 \Rightarrow t_{1,2} = \frac{1 \pm \sqrt{1+8}}{4} = \begin{cases} 1 \\ -\frac{1}{2} \end{cases}$ *non acc.*

$x^2 = 1 \Rightarrow x = \pm 1$

33. $3^{x+1} + 3^{x-2} - \frac{247}{3^{x-2}} = \frac{15}{3^{x-1}}$

$3^x \cdot 3^1 + 3^x \cdot 3^{-2} - \frac{247}{3^x \cdot 3^{-2}} = \frac{15}{3^x \cdot 3^{-1}}$

$3 \cdot 3^x + \frac{3^x}{9} - \frac{247 \cdot 9}{3^x} = \frac{15 \cdot 3}{3^x} \qquad pongo\ 3^x = t$

$3t + \frac{t}{9} - \frac{2223}{t} - \frac{45}{t} = 0 \Rightarrow 27t^2 + t^2 - 9 \cdot (2223 + 45) = 0$

$28t^2 = 9 \cdot 2268 \Rightarrow t^2 = 9 \cdot 81 \Rightarrow t^2 = 3^2 \cdot 3^4 \Rightarrow$

$t^2 = 3^6 \quad \Rightarrow \quad t = 3^3 \quad \Rightarrow \quad 3^x = 3^3 \quad \Rightarrow \quad \boxed{x = 3}$

$\Rightarrow \quad t = -3^3 \quad imp.$

34. $13 \cdot 3^{1+x} - 3^{3-x} - \frac{13}{3^x} + 1 = 0$

$13 \cdot 3 \cdot 3^x - \frac{3^3}{3^x} - \frac{13}{3^x} + 1 = 0 \qquad pongo \;\; 3^x = t$

$39\,t - \frac{27}{t} - \frac{13}{t} + 1 = 0 \quad \Rightarrow \quad 39\,t^2 + t - 40 = 0$

$\Rightarrow \quad t_{1,2} = \frac{-1 \pm \sqrt{1 + 6240}}{78} = \begin{cases} \frac{-1+79}{78} = 1 \\ \frac{-1-79}{78} = -\frac{40}{39} \end{cases}$

$t = 1 \quad \Rightarrow \quad 3^x = 3^0 \quad \Rightarrow \quad \boxed{x = 0}$

$t = -\frac{40}{39} \quad \Rightarrow \quad 3^x = -\frac{40}{39} \quad \Rightarrow \; imp.$

35. $4^{2-x} - 5 \cdot 2^{1-x} + 1 = 0$

$\frac{4^2}{4^x} - 5 \cdot \frac{2^1}{2^x} + 1 = 0 \qquad pongo \;\; 2^x = t$

$\frac{16}{t^2} - \frac{10}{t} + 1 = 0 \quad \Rightarrow$

$t^2 - 10t + 16 = 0 \quad \Rightarrow \quad t_{1,2} = \frac{5 \pm \sqrt{25 - 16}}{1} = \begin{cases} 8 \\ 2 \end{cases}$

$t = 8 \quad \Rightarrow \quad 2^x = 2^3 \quad \Rightarrow \quad \boxed{x = 3}$

$t = 2 \quad \Rightarrow \quad 2^x = 2^1 \quad \Rightarrow \quad \boxed{x = 1}$

36. $\frac{3 \cdot 3^x + 3^{2-x} - 4}{3^x} = \frac{8}{3}$

$\frac{3 \cdot 3^x + \frac{3^2}{3^x} - 4}{3^x} = \frac{8}{3} \qquad pongo \;\; 3^x = t$

$\frac{3\,t + \frac{3^2}{t} - 4}{t} = \frac{8}{3} \quad \Rightarrow \quad 9t^2 + 27 - 12t - 8t^2 = 0$

$t^2 - 12t + 27 = 0 \quad \Rightarrow \quad t_{1,2} = \frac{6 \pm \sqrt{36 - 27}}{1} = \begin{cases} 9 \\ 3 \end{cases}$

$t = 9 \quad \Rightarrow \quad 3^x = 3^2 \quad \Rightarrow \quad \boxed{x = 2}$

$t = 3 \quad \Rightarrow \quad 3^x = 3^1 \quad \Rightarrow \quad \boxed{x = 1}$