**ESERCIZI ESPONENZIALI**

Risolvere le seguenti equazioni e disequazioni:

1. $3^x - 9 \cdot \frac{\sqrt{3}}{\sqrt[5]{9}} = 0,\ 3^x - 3^2 \frac{3^{\frac{1}{2}}}{3^{\frac{2}{5}}} = 0 \Rightarrow 3^x = 3^2 \frac{3^{\frac{1}{2}}}{3^{\frac{2}{5}}} = 3^{2+\frac{1}{2}-\frac{2}{5}} = 3^{\frac{20+5-4}{10}} = 3^{\frac{21}{10}} \Rightarrow 3^x = 3^{\frac{21}{10}} \Rightarrow x = \frac{21}{10}$

2. $8^{x-1} = \sqrt[3]{2^{x-3}}$ $\quad x = \frac{3}{4}$ ,

3. $\left(\frac{1}{2}\right)^{2x} - \frac{12}{2^x} + 32 = 0$ $\quad x = -3;\quad x = -2$ ,

4. $\frac{\sqrt{3 \cdot \sqrt{9^x}}}{81^{x-1}} = 9^{1+2x}$ $\quad x = \frac{1}{3}$

5. $\frac{5^x}{5^x + 1} - \frac{1}{25^x - 1} = 1$ $\quad \varnothing$ ,

6. $\begin{cases} 36 \cdot 6^{x-y} = 6^{2x} & x = -\frac{2}{3} \\ 49^x \cdot \sqrt{7^y} = 1 & y = \frac{8}{3} \end{cases}$ ,

7. $a) 3^{x+1} - \frac{3^x}{9} + 3^x = 35$ $\quad x = 2$
   $b) 9^x + 2 \cdot 3^{x+1} - 27 \geq 0$ $\quad x \geq 1$ ,

8. $\left(4^{x-1}\right)^{x+1} = 8^{x^2-2}$ $\quad x = 2;\quad x = -2$ ,

9. $a) 2 \cdot 3^x - 9^x = 1$ $\quad x = 0$
   $4^x + 3 \cdot 2^x + 2 > 0$ $\quad \forall x$ ,

10. $\frac{2^{2x}}{1 + 2^x} = 1 - \frac{2^x}{2^x + 1}$ $\quad x = 0$ .

11. $\left|3^x - 3\right| > 6$ $\quad x > 2$

12. $2^{2x+2} - 3 \cdot 2^x - 1 = 0$ $\quad x = 0$

13. $7^{\frac{x}{2}} \cdot 7^{-\frac{1}{2}} \cdot 7^3 = \sqrt{7\sqrt[3]{7}}$ $\quad x = -\frac{11}{3}$

14. $\left(3^{2x-1}\right)^x = 81^{\frac{1-x}{2}}$ $\quad x = 1;\quad x = -2$