

Equazioni esponenziali

1.  $2^x = \frac{1}{8}$

$$2^x = 2^{-3} \Rightarrow x = -3$$

2.  $(0,1)^x = 10$

$$10^{-x} = 10^1 \Rightarrow x = -1$$

3.  $\left(\frac{2}{3}\right)^x = \frac{27}{8}$

$$\left(\frac{2}{3}\right)^x = \left(\frac{3}{2}\right)^3 \Rightarrow \left(\frac{2}{3}\right)^x = \left(\frac{2}{3}\right)^{-3} \Rightarrow x = -3$$

4.  $(\sqrt{7})^x = 49$

$$\left(7^{\frac{1}{2}}\right)^x = 7^2 \Rightarrow \frac{1}{2}x = 2 \Rightarrow x = 4$$

5.  $\left(\sqrt[3]{\frac{2}{5}}\right)^x = \frac{25}{4}$

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

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

$$(2^{-1})^x = 2^1 \Rightarrow -x = 1 \Rightarrow x = -1$$

7.  $(2\sqrt{3})^x = 144$

$$(\sqrt{12})^x = 144 \Rightarrow (12^{\frac{1}{2}})^x = 12^2 \Rightarrow \frac{1}{2}x = 2 \Rightarrow x = 4$$

8.  $25^x = 5$

$$(5^2)^x = 5^1 \Rightarrow 2x = 1 \Rightarrow x = \frac{1}{2}$$

Equazioni esponenziali

9.  $(0,03)^x = 1$   
 $(0,03)^x = (0,03)^0 \Rightarrow x = 0$

10.  $3^{2x+1} = 1$   
 $3^{2x+1} = 3^0 \Rightarrow 2x + 1 = 0 \Rightarrow 2x = -1 \Rightarrow x = -\frac{1}{2}$

11.  $2^{2-x} = 8$   
 $2^{2-x} = 2^3 \Rightarrow 2 - x = 3 \Rightarrow x = -1$

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

13.  $3^{4+x} = 9$   
 $3^{4+x} = 3^2 \Rightarrow 4 + x = 2 \Rightarrow x = -2$

14.  $\left(\frac{1}{2}\right)^{x-2} = 4$   
 $(2^{-1})^{x-2} = 2^2 \Rightarrow -x + 2 = 2 \Rightarrow x = 0$

15.  $e^{3x} = e^2$   
 $3x = 2 \Rightarrow x = \frac{2}{3}$

16.  $e^{2x-1} = e^{\frac{1}{x}}$   
 $2x - 1 = \frac{1}{x} \Rightarrow 2x^2 - x - 1 = 0 \quad c.a.: x \neq 0$   
 $x_{1,2} = \frac{1 \pm \sqrt{1+8}}{4} = \left\langle \begin{array}{l} 1 \\ -\frac{1}{2} \end{array} \right.$   
 $x = 1; x = -\frac{1}{2}$

Equazioni esponenziali

17.  $e^{-x+1} = -3$

**nessuna soluzione** perché  $e^{-x+1} > 0 \forall x \in R$

18.  $e^{-x+4} = -e^{5x+1}$

**nessuna soluzione** perché  $e^{-x+4} > 0 \forall x \in R$

19.  $7^{2x+5} = 7^{\frac{x-1}{2}}$

$$2x + 5 = \frac{x-1}{2} \Rightarrow 4x + 10 = x - 1 \Rightarrow 3x = -11 \Rightarrow x = -\frac{11}{3}$$

20.  $3^{x+7} = \frac{1}{3^{x-5}}$

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

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

$$2^{2 \cdot \frac{3+x}{x-1}} = 2^{5x} \Rightarrow \frac{6+2x}{x-1} = 5x \Rightarrow 6+2x = 5x^2 - 5x \quad c.a.: x \neq 1$$

$$5x^2 - 7x - 6 = 0$$

$$x_{1,2} = \frac{7 \pm \sqrt{49 + 120}}{10} = \begin{cases} 2 \\ -\frac{3}{5} \end{cases}$$

$$x = 2; x = -\frac{3}{5}$$

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

$$2^{\frac{x+9}{1-x}} = 2^{-2} \Rightarrow \frac{x+9}{1-x} = -2 \Rightarrow x+9 = -2+2x \quad c.a.: x \neq 1 \Rightarrow x = 11$$

23.  $7^{\sqrt{x^2-1}} = 49$

$$7^{\sqrt{x^2-1}} = 7^2 \Rightarrow \sqrt{x^2-1} = 2 \Rightarrow x^2-1 = 4 \quad c.a.: x \leq -1 \vee x \geq 1$$

$$x^2 = 5 \Rightarrow x = \pm\sqrt{5}$$