Esercizio n° 434 (Matem. e realtà)

ore 15:00 → 500 batteri
ore 17:00 → 2000 batteri (dopo 2 ore)

$y(t) = a\,b^t$

$y(0) = 500$
$y(2) = 2.000$

- $y(0) = 500$

$a \cdot b^0 = 500 \rightarrow a = 500$

- $y(2) = 2000$

$a \cdot b^2 = 2000$

$500b^2 = 2000 \rightarrow b^2 = 4 \rightarrow b = +2$ (n° pos.)

- $y = 500 \cdot 2^t$

quanti batteri dopo 5 ore?

$y(5) = 500 \cdot 2^5 = 500 \cdot 32 = 16.000$

Eserc. gare di mat

n° 435

$9^x - 9^{x-1} = 216$

$9^x - \frac{9^x}{9} = 216$

$\frac{9 \cdot 9^x - 9^x}{9} = \frac{216 \cdot 9}{9}$

$9^x(9-1) = 216 \cdot 9$

$9^x = \frac{216 \cdot 9}{8} = 243$ $\quad 243 = 3^5$

$3^{2x} = 3^5$

$x = \frac{5}{2}$

$2^x = 2^{\frac{5}{2}} = \sqrt{2^5} = \sqrt{2 \cdot 2^4} = 2^2\sqrt{2} = 4\sqrt{2}$

es. n° 436

$y = 2^{x+2}$

$y = 4^{3x-4}$

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

$2^{x+2} = 2^{6x-8}$

$x+2 = 6x-8$

$10 = 5x$

$x = 2$

$x = 2$

$y = 2^{2+2} = 2^4 = 16$

$(2, 16)$ punto di intersezione.

es. n° 437

$9^{-x} = 7$ $\quad 9^{x} = 7^{-1}$ $\quad 3^{2x} = 7^{-1}$ $\quad 3^{x} = 7^{-\frac{1}{2}}$

$27^{2x+1} = ?$

$27^{2x+1} = 27 \cdot 27^{2x} = 27 \cdot (27^x)^2$

$27^x = 3^{3x} = (3^x)^3 =$

$= (7^{-\frac{1}{2}})^3 = 7^{-\frac{3}{2}}$

$(27^x)^2 = \left(7^{-\frac{3}{2}}\right)^2 = 7^{-3}$

$27(27^x)^2 = 27 \cdot 7^{-3} = \frac{27}{7^3} = \frac{27}{343}$

es. n° 438

a) $e^{x^2} = e^{4x} \cdot \frac{1}{e^3}$ $\quad e^{x^2} = e^{4x-3}$

$x^2 = 4x - 3$

$x^2 - 4x + 3 = 0$ $\quad x = 1;\ x = 3$

b) $9^{16-x} = 27^{x}$

$3^{32-2x} = 3^{3x}$

$32 - 2x = 3x$

$32 = 5x$

$x = \frac{32}{5}$

c) $2^{2x} - 3 \cdot 2^{x-2} + 32 = 0$

$2^{2x} - 3 \cdot 2^{x} \cdot 2^{-2} + 32 = 0$

$2^{2x} - \frac{3}{4} \cdot 2^{x} + 32 = 0$

$y^2 - \frac{3}{4} y + 32 = 0$

$4y^2 - 3y + 128 = 0$

2 soluzioni complesse

n° 439

a) $3^{x} = 2$

$9^{-2x} = ?$

$9^{-2x} = (3^2)^{-2x} = (3^{x})^{-4} = 2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

b) $2^{x} = 7$

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

c)

$5^{-x} = 27$

$5^{x} = \frac{1}{27}$

$5^{-x} \cdot \sqrt[3]{25^{2x}} = 5^{-x} \cdot \sqrt[3]{(5^2)^{2x}} = 27 \cdot \sqrt[3]{5^{4x}} = 27 \cdot 5^{\frac{4x}{3}} =$

$= 27 \cdot (5^x)^{\frac{4}{3}} = 27 \left(\frac{1}{27}\right)^{\frac{4}{3}} = \frac{27}{27^{\frac{4}{3}}} = 27^{1-\frac{4}{3}} =$

$= 27^{-\frac{1}{3}} = \left(\frac{1}{27}\right)^{\frac{1}{3}} = \left(\frac{1}{3^3}\right)^{\frac{1}{3}} = \frac{1}{3}$