

25. $x^2 2^x - 2^x = 0 \Leftrightarrow 2^x(x^2 - 1) = 0 \Rightarrow 2^x = 0$ (never) or $x^2 - 1 = 0$. If $x^2 - 1 = 0$, then $x^2 = 1 \Rightarrow x = \pm 1$. So the only solutions are $x = \pm 1$.
27. $4x^3 e^{-3x} - 3x^4 e^{-3x} = 0 \Leftrightarrow x^3 e^{-3x}(4 - 3x) = 0 \Rightarrow x = 0$ or $e^{-3x} = 0$ (never) or $4 - 3x = 0$. If $4 - 3x = 0$, then $3x = 4 \Leftrightarrow x = \frac{4}{3}$. So the solutions are $x = 0$ and $x = \frac{4}{3}$.
29. $e^{2x} - 3e^x + 2 = 0 \Leftrightarrow (e^x - 1)(e^x - 2) = 0 \Rightarrow e^x - 1 = 0$ or $e^x - 2 = 0$. If $e^x - 1 = 0$, then $e^x = 1 \Leftrightarrow x = \ln 1 = 0$. If $e^x - 2 = 0$, then $e^x = 2 \Leftrightarrow x = \ln 2 \approx 0.6931$. So the solutions are $x = 0$ and $x \approx 0.6931$.
31. $e^{4x} + 4e^{2x} - 21 = 0 \Leftrightarrow (e^{2x} + 7)(e^{2x} - 3) = 0 \Rightarrow e^{2x} = -7$ or $e^{2x} = 3$. Now $e^{2x} = -7$ has no solution, since $e^{2x} > 0$ for all x . But we can solve $e^{2x} = 3 \Leftrightarrow 2x = \ln 3 \Leftrightarrow x = \frac{1}{2} \ln 3 \approx 0.5493$. So the only solution is $x \approx 0.5493$.
33. $\ln x = 10 \Leftrightarrow x = e^{10} \approx 22026$