

**Aim: How do we solve exponential and logarithmic equations involving  $e$ ?****I. Do Now:**

1. Fill in the blanks:

i)  $\log_b 1 = 0 \Rightarrow \ln 1 = \underline{\hspace{2cm}}$

ii)  $\log_b b = 1 \Rightarrow \ln e = \underline{\hspace{2cm}}$

iii)  $\log_b (b^x) = x \Rightarrow \ln e^x = \underline{\hspace{2cm}}$

iv)  $10^{\log x} = x \Rightarrow e^{\ln x} = \underline{\hspace{2cm}}$

3. Solve for  $x$ :

$\ln x - \ln \sqrt{x} = 4$

4. Solve for  $x$ :

$2e^{-4x} + 3 = 17$

2. Condense and simplify:

$\ln x^5 - \ln \sqrt[3]{2x} + \ln\left(\frac{3}{x}\right)$

**II. Solve for  $x$ :**

5.  $-3e^{5x+1} - 7 = -91$

6.  $\ln \sqrt{x+3} = -1$

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

8.  $e^{2\ln x} = 25$

9.  $e^{2\ln x} = 5$

10.  $2 - \ln(3-x) = 0$

11.  $e^{4x} + 4e^{2x} - 21 = 0$

12.  $e^{3x} = 3^{x+1}$

13.  $\ln(\log x) = 2$

14.  $\ln(x+1) - 1 = \ln(x-1)$

15.  $\ln(3x+1) - \ln(x+2) = 5$

16.  $2\ln(x+1) + \ln 5 = \ln 7$

17.  $e^{4\ln x} = \ln e^8$

18.  $\ln x + \ln 3 = 6$

19.  $e^{\ln(\log x)} = 2$