



D: Solve the following equations for x. Recall: ln is simply log_e

▼ Evaluate the following expressions. (Express as a single number)

1. $\ln 0$

2. $\ln e^3$
3

3. $\ln e$
1

4. $\ln e^5 + 2$
7

5. $\ln e^9 + \ln e^6$
15

▼ Expand the following expressions

6. $\ln\left(\frac{7xc}{m}\right) = \ln 7xc - \ln m$
 $= \ln 7 + \ln x + \ln c - \ln m$

7. $\ln(xy^6z^4) = \ln x + \ln y^6 + \ln z^4$
 $= \ln x + 6\ln y + 4\ln z$

8. $\ln\sqrt{n^7p}$
 $= \ln(n^7p)^{1/2}$
 $= \frac{1}{2}\ln n^7p$
 $= \frac{7}{2}\ln n + \frac{1}{2}\ln p$

▼ Condense the following expressions

9. $\frac{1}{3}\ln 4 + \frac{1}{3}\ln j - 5\ln k$
 $= \ln 4^{1/3} + \ln j^{1/3} - \ln k^5$
 $= \ln(4j)^{1/3} - \ln k^5$
 $= \ln \sqrt[3]{4j} - \ln k^5$
 $= \ln \frac{\sqrt[3]{4j}}{k^5}$

10. $3\ln a - 6\ln b$
 $= \ln a^3 - \ln b^6$
 $= \ln \frac{a^3}{b^6}$

11. $3\ln r - (4\ln s + 5\ln t)$
 $= \ln r^3 - (\ln s^4 + \ln t^5)$
 $= \ln r^3 - \ln(s^4t^5)$
 $= \ln \frac{r^3}{s^4t^5}$

▼ Solve for x

12. $e^x \cdot e^{4x} = 14$
 $\sqrt[5]{e^{5x}} = 14$
 $\frac{\ln 14}{5} = \frac{5x}{5}$
 $x = \frac{\ln 14}{5}$

13. $3(e^x) = 36$
 $\sqrt[5]{e^x} = 12$
 $\ln 12 = x$

14. $\frac{1}{6}e^x = 6$
 $\sqrt[5]{e^x} = 36$
 $\ln 36 = x$

15. $\ln x = 7$
 $e^7 = x$

16. $7\ln x - 6 = 1$
 $\frac{7\ln x}{7} = \frac{7}{7}$
 $\ln x = 1$
 $e^1 = x$

17. $6\ln(x+5) = 12$
 $\ln(x+5) = 2$
 $e^2 = x+5$
 $-5 \quad -5$
 $e^2 - 5 = x$