Solving Natural Logarithmic Equations

General Expectations

- Show all steps clearly.
- Give exact answers only (no decimals).
- **Reject any value that makes a logarithm undefined.**

Direct Inverse

1. $\ln\ x = 11$
2. $\ln\ (e^{4-x}) = 6$
3. $e^{3x} = 4$

Algebra

4. $\ln\ (x - 1) = 2$
5. $\ln\ (3x - 2) = 4$
6. $e^{5-3x} = 4$

Log Laws → Solve

7. $\ln\ x = \ln\ 11 + \ln\ 6 - \ln\ 3$
8. $\ln\ (x + 2) = \ln\ (3x - 4)$
9. $\ln\ (2x + 1) = \ln\ (5x - 8)$

Nested / Structure

10. $\ln\ (\ln\ x) = 4$
11. $\ln\ (e^{3x}) = \ln\ (2e^{x})$

Algebra + Logs

12. $\ln\ (x^2 - 5x + 6) = 0$
    Reject any values that make a logarithm undefined
13. $2\ln\ x = \ln\ (4x + 5)$
    Reject any values that make a logarithm undefined
14. $\ln\ (x^2 - 3x) = 1$
    Reject any values that make a logarithm undefined

Quadratic in ln *x*

15. $(\ln\ x)^2 + \ln\ x = 2$
16. $(\ln\ x)^2 - 3\ln\ x + 2 = 0$
17. $(\ln\ x)^2 + 2\ln\ x - 3 = 0$

Conceptual Finish

18. $\ln\ (x(x - 2)) = 1$
    Reject any values that make a logarithm undefined
19. $\ln\ (e^{2x} + e^{x}) = 3$