DIRECTIONS: Write each equation in exponential form.

1. $\ln 100 = 4.61$

$e^{4.61} = 100$

2. $\ln \frac{1}{3} = -1.10$

$e^{-1.10} = \frac{1}{3}$

DIRECTIONS: Write each equation in logarithmic form.

3. $e^7 = 1097$

$\ln 1097 = 7$

4. $\sqrt[3]{e} = 1.40$

$\ln 1.40 = \frac{1}{3}$

DIRECTIONS: Simplify

5. $\ln e^9$

9

6. $\ln \frac{1}{e^7}$

−7

7. $\ln \sqrt{e}$

$\frac{1}{2}$

DIRECTIONS: Write as a single logarithm.

8. $\ln 8 + \ln 2$

$\ln 16$

9. $\ln 7 + \frac{1}{2}\ln 9$

$\ln 21$

10. $4 \ln 2 - \ln 3 - 1$

$\ln \frac{16}{3e}$

DIRECTIONS: Solve for x. Leave answers in terms of e.

11. $\ln x = 3$

$x = e^3$

12. $\ln(x - 4) = -1$

$x = 4 + \frac{1}{e}$

13. $\ln x^2 = 9$

$x = e^{9/2}$ or $e^4\sqrt{e}$ or $e^{4.5}$

DIRECTIONS: Solve for x. Leave answers in terms of natural logarithms.

14. $e^x = 2$

$x = \ln 2$

15. $e^{2x} = 25$

$x = \ln 5$

(from $\frac{1}{2}\ln 25$)

16. $e^{x-2} = 2$

$x = 2 + \ln 2$