DIRECTIONS: Write each equation in exponential form.

1. $\ln 10 = 2.30$
$e^{2.30} = 10$

2. $\ln 50 = 3.91$
$e^{3.91} = 50$

3. $\ln \frac{1}{4} = -1.39$
$e^{-1.39} = \frac{1}{4}$

4. $\ln \frac{1}{e^3} = -3$
$e^{-3} = \frac{1}{e^3}$

DIRECTIONS: Write each equation in logarithmic form.

5. $e^4 = 54.6$
$\ln 54.6 = 4$

6. $e^9 = 8103$
$\ln 8103 = 9$

7. $e^{1/4} = 1.28$
$\ln 1.28 = \frac{1}{4}$

8. $\sqrt{e} = 1.65$
$\ln 1.65 = \frac{1}{2}$

DIRECTIONS: Simplify. If the expression is undefined, say so.

9. $\ln e^4$
4

10. $\ln e^7$
7

11. $\ln \frac{1}{e^5}$
–5

12. $\ln \sqrt{e}$
$\frac{1}{2}$

13. $\ln 1$
0

14. $\ln(-1)$
undefined

15. $e^{\ln 1.2}$
1.2

16. $e^{\ln \sqrt{3}}$
$\sqrt{3}$

DIRECTIONS: Write as a single logarithm.

17. $\ln 3 + \ln 7$
$\ln 21$

18. $\ln 12 - \ln 3$
$\ln 4$

19. $\ln 11 + \frac{1}{2}\ln 4$
$\ln 22$

20. $3 \ln 3 - \ln 2 + 2$
$\ln \frac{27e^2}{2}$

DIRECTIONS: Solve for x. When necessary, give answers to three decimal places.

21. $\ln x = 5$ $x \approx 148.413$

22. $\ln \frac{1}{x} = 3$ $x \approx .050$

23. $\ln(x - 2) = 2$ $x \approx 9.389$

24. $\ln \sqrt{x + 5} = 1$ $x \approx 2.389$

DIRECTIONS: Solve. Round your answers to the nearest cent.

25. You deposit $2000 in an account that earns 5% annual interest. Find the balance after three years if the interest is compounded…

a. annually $2315.25

b. quarterly $2321.51

c. monthly $2322.94

26. If Heather invests $3500 in a fund that earns 10% annual interest, compounded every six months, how much will she have after 20 years?

$24,639.96

DIRECTIONS: Solve for x.

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

$x = 7$

28. $e^{2x-1} = e^{3-x}$

$x = \frac{4}{3}$

29. $10^{x} = 10^{7-3x}$

$x = \frac{7}{4}$

DIRECTIONS: Solve for x. When necessary, give answers to three decimal places.

30. $e^{x} = 5$

$x \approx 1.609$

31. $e^{2x} = 6$

$x \approx 0.896$

32. $2^{x} + 5 = 12$

$x \approx 2.807$

DIRECTIONS: Solve for x.

33. $\log_2(4x) = \log_2 12$

$x = 3$

34. $\log_3(x-1) = \log_3(2x+5)$

No solution (x can't be –6)

35. $\ln(x+3) = \ln(6-3x)$ $x = \frac{3}{4}$

DIRECTIONS: Solve for x. When necessary, give answers to three decimal places.

36. $\ln(5x-3) = 2$

$x \approx 2.078$

37. $\ln(3x+1) = 0$

$x = 0$

38. $\log(4x) + 1 = 3$

$x = 25$