Name_____ Class_____ Date_____

16-2 Practice

Natural Logarithms

Write each expression as a single natural logarithm.

1. $\ln 16 - \ln 8$

2. $3 \ln 3 + \ln 9$

3. $a \ln 4 - \ln b$

4. $\ln z - 3 \ln x$

5. $\frac{1}{2} \ln 9 + \ln 3x$

6. $4 \ln x + 3 \ln y$

7. $\frac{1}{3} \ln 8 + \ln x$

8. $3 \ln a - b \ln 2$

9. $2 \ln 4 - \ln 8$

Solve each equation. Check your answers. Round your answer to the nearest hundredth.

10. $4 \ln x = -2$

11. $2 \ln (3x - 4) = 7$

12. $5 \ln (4x - 6) = -6$

13. $-7 + \ln 2x = 4$

14. $3 - 4 \ln (8x + 1) = 12$

15. $\ln x + \ln 3x = 14$

16. $2 \ln x + \ln x^2 = 3$

17. $\ln x + \ln 4 = 2$

18. $\ln x - \ln 5 = -1$

19. $\ln e^x = 3$

20. $3 \ln e^{2x} = 12$

21. $\ln e^{x+5} = 17$

22. $\ln 3x + \ln 2x = 3$

23. $5 \ln (3x - 2) = 15$

24. $7 \ln (2x + 5) = 8$

25. $\ln (3x + 4) = 5$

26. $\ln \frac{2x}{41} = 2$

27. $\ln (2x - 1)^2 = 4$

Use natural logarithms to solve each equation. Round your answer to the nearest hundredth.

28. $e^x = 15$

29. $4e^x = 10$

30. $e^{x+2} = 50$

31. $4e^{3x-1} = 5$

32. $e^{x-4} = 2$

33. $5e^{6x+3} = 0.1$

34. $e^x = 1$

35. $e^{\frac{x}{5}} = 32$

36. $3e^{3x-5} = 49$

37. $7e^{5x+8} = 0.23$

38. $6 - e^{12x} = 5.2$

39. $e^{\frac{x}{5}} = 25$

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

41. $e^{\ln 5x} = 20$

42. $e^{\ln x} = 21$

43. $e^{x+6} + 5 = 1$

By measuring the amount of carbon-14 in an object, a paleontologist can determine its approximate age. The amount of carbon-14 in an object is given by $y = ae^{-0.00012t}$, where a is the amount of carbon-14 originally in the object, and t is the age of the object in years.

44. A fossil of a bone contains 32% of its original carbon-14. What is the approximate age of the bone?

45. A fossil of a bone contains 83% of its original carbon-14. What is the approximate age of the bone?