8.5 Homework-> Properties of Logarithms

Part 1: Use a property of logarithms to evaluate each expression.

1. $log_2 (4 \cdot 16)$

2. $log_3 9^4$

3. $\ln e^{-2}$

4. $\log \frac{1}{10}$

5. $log_2 4^3$

6. $\ln \frac{1}{e^3}$

7. $log_5 125$

8. $\log(0.01)^3$

Part 2A: Use log 5 ≈ 0.699 and log 15 ≈ 1.176 to approximate the value of each expression.

9. $\log 3$

10. $\log 75$

11. $\log 25$

12. $\log 125$

13. $\log \frac{1}{5}$

14. $\log 225$

15. $\log \frac{1}{15}$

16. $\log \frac{1}{3}$

Part 2B: Use $log_2 7$ ≈ 2.81 and $log_2 21$ ≈ 4.39 to approximate the value of each expression.

17. $log_2 3$

18. $log_2 49$

19. $log_2 147$

20. $log_2 441$

Part 3: Expand each expression.

21. $log_2 9x$

22. $\ln 22x$

23. $\log 4x^5$

24. $log_6 x^6$

25. $\log 6x^3yz$

26. $\ln x^{\frac{1}{2}} y^3$

27. $\log \sqrt[4]{x^3}$

28. $log_4 \frac{4}{3}$

Part 3 (Continued): Expand each expression.

29. $\log_3 25$

30. $\log_6 \frac{10}{3}$

31. $\ln 3xy^3$

32. $\log_8 64x^2$

33. $\log_3 12^{\frac{5}{6}} x^9$

34. $\log \sqrt{x}$

35. $\ln \frac{3y^4}{x^3}$

36. $\log_2 \sqrt{4x}$

Part 4: Condense each expression.

37. $\log_5 8 - \log_5 12$

38. $2 \log x + \log 5$

39. $3 \ln x + 5 \ln y$

40. $\ln 20 + 2 \ln \frac{1}{2} + \ln x$

41. $10 \log x + 2 \log 10$

42. $\ln 16 - \ln 4$

43. $4 \log_{16} 12 - 4 \log_{16} 2$

44. $7 \log_4 2 + 5 \log_4 x + 3 \log_4 y$

45. $\log_3 2 + \frac{1}{2} \log_3 y$

46. $3(\ln 3 - \ln x) + (\ln x - \ln 9)$

**47. $2(\log_6 15 - \log_6 5) + \frac{1}{2} \log_6 \frac{1}{25}$

**48. $\frac{1}{4} \log_5 81 - (2 \log_5 6 - \frac{1}{2} \log_5 4)$

Part 5: Use the change-of-base formula to evaluate each expression.

49. $\log_5 7$

50. $\log_2 5$

51. $\log_2 125$

52. $\log_8 \frac{22}{7}$

53. $\log_7 12$

54. $\log_6 9$

55. $\log_6 24$

56. $\log_9 \frac{5}{16}$

57. $\log_3 16$

58. $\log_3 17$

59. $\log_4 19$

60. $\log_2 \frac{4}{15}$

61. $\log_9 25$

62. $\log_5 32$

63. $\log_{16} 81$

64. $\log_5 \frac{32}{3}$