3.3 Properties of Logarithms

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In exercises 15, 18, 20, and 21, evaluate the logarithm using the change-of-base formula. Round your result to three decimal places.

P 15. $\log_3 7$

P 20. $\log_{20} 0.25$

P 18. $\log_{1/4} 5$

P 21. $\log_{15} 1250$

In exercises 24, 26, 27, and 28, simplify.

P 24. $\log_2(4^2 \cdot 3^4)$

P 27. $\ln(5e^6)$

P 26. $\log \dfrac{9}{300}$

P 28. $\ln \dfrac{6}{e^2}$

In exercises, 30, 32, 34, and 42, find the exact value.

P 30. $\log_5 \dfrac{1}{125}$

P 34. $\log_3 81^{-3}$

P 32. $\log_6 \sqrt[3]{6}$

P 42. $2\ln e^6 - \ln e^5$

In exercises 46, 54, 56, and 66, expand the expression.

P 46. $\log_3 10z$

P 56. $\ln\left(\dfrac{x^2 - 1}{x^3}\right)$, $x > 1$

P 54. $\log 4x^2 y$

P 66. $\ln \sqrt{x^2(x+2)}$

In exercises 76, 80, 83, and 84, condense the expression.

P 76. $2\ln 8 + 5\ln(z-4)$

P 83. $\dfrac{1}{3}[\log_8 y + 2\log_8(y+4)] - \log_8(y-1)$

P 80. $4[\ln z + \ln(z+5)] - 2\ln(z-5)$

P 84. $\dfrac{1}{2}[\log_4(x+1) + 2\log_4(x-1)] + 6\log_4 x$