

## Derivatives of Logarithmic Functions

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In problems 1-11, find the derivative of the function

1. $y = \ln x^5$	2. $y = \ln(x^2 - 7x + 1)$
3. $y = \ln \sqrt[5]{4x-1}$	4. $y = x^3 \ln(5x+2)$
5. $y = \ln \frac{8x+2}{7x-1}$	6. $y = \ln \sqrt[5]{\frac{x^2}{x^2+3}}$
7. $y = (\ln(7x-1))^5$	8. $y = \ln \frac{\sqrt{2x-3}}{x}$
9. $y = e^{3x-1} \ln(x^2 - 5x)$	10. $y = e^{2+3\ln x}$
11. $y = \ln \frac{1-4e^x}{1+4e^x}$	

In problems 12-14, evaluate the logarithm without using a calculator

12. $\log_2 32$	13. $\log_3 \frac{1}{81}$
14. $\log_5 25$	

In problems 15-17, use the change-of-base formula and a calculator to evaluate the logarithm (4 decimal places)

15. $\log_7 13$	16. $\log_8 11$
17. $\log_3 \frac{1}{4}$	

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In problems 18-22, find the derivative of the function

18. $y = 4^x$	19. $y = \log_4 x$
20. $y = 2^{8x+1}$	21. $y = \log_7(x^2 + 3x)$
22. $y = (\log_3 x)4^x$	

In problems 23-24, find an equation of the tangent line to the graph of the function at the given point

23. $y = \ln(x-3)^2, (4,0)$	24. $y = x^3 \ln x, (e, e^3)$
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In problems 25-26, find  $dy/dx$  implicitly

25. $x^3 - \ln y^3 + 3x = y$	26. $\ln(xy) - y^4 = 7x^2 + 3$
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In problems 27, find an equation of the tangent line to the graph of the function at the given point

27. $1 = \ln(x^3 - 7) + y, (2,1)$	
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