Calculus 120

Worksheet – Derivatives of Exponential and Logarithmic Functions

This worksheet is arranged in order of increasing difficulty.

For problems 1-8, find the derivative of the given function:

1. $f(x) = \ln(x)$
2. $f(x) = e^x$
3. $f(x) = 2^x$
4. $f(x) = \log_{10}(x)$
5. $f(x) = 8^x - \log_6(x)$
6. $f(x) = \log_4(x) + 16^x$
7. $f(x) = 4e^x - 4^x$
8. $f(x) = 6\ln(x)$

For problems 9-13, find the derivative of the function at the given point:

9. $f(x) = 2e^x - x$,   at $x = 1$
10. $f(x) = x^3 - 5x$,   at $x = 2$
11. $f(x) = \ln(x) - 3^x$,   at $x = 3$
12. $f(x) = 6 \cdot 5^x + \log_{10}(x)$,   at $x = 2$
13. $f(x) = 10 \cdot e^x + 7x$,   at $x = 0$

For problems 14-28, find the derivative of the given function.

14. $f(x) = e^{-3x}$

15. $f(x) = -e^{3x^2}$

16. $f(x) = \dfrac{5x}{e^x}$

17. $f(x) = \dfrac{3x^3}{e^x}$

18. $f(x) = x^3 \ln(x)$

19. $f(x) = \log_7(3x)$

20. $f(x) = \log_3(x^2 + 1)$

21. $f(x) = \dfrac{\log_{10}(x)}{x}$

22. $f(x) = \dfrac{e^{2x}}{x}$

23. $f(x) = \dfrac{\left(e^x\right)^4}{x^2}$

24. $f(x) = x^2 \ln(x^2 + 3x)$

25. $f(x) = x^3 \cdot 8^x$

26. $f(x) = \dfrac{(2x)^2}{e^{2x}}$

27. $f(x) = x^5 \log_2(x^2)$

28. $f(x) = \dfrac{e^{2x}}{x^2}$