

1. Differentiation of Exponential and Logarithmic Functions

Example

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|----------------------------|----------------------------|
| 1. $y = \frac{e^x}{2x^2}$ | $\frac{e^x(2 - 4x)}{4x^3}$ |
| 2. $y = e^{2x}$ | $2e^{2x}$ |
| 3. $y = \frac{1}{2}e^{3x}$ | $\frac{3}{2}e^{3x}$ |
| 4. $y = \ln(x + 2)$ | $\frac{1}{x+2}$ |

5. $y = \ln(x + 2) - 2x$ $\frac{1}{x+2} - 2$
 Solve the following equations for x

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| 6. $2^{3x} = 8$ | $x = \frac{\log_2 8}{\log_2 2}$ |
| 7. $\frac{1}{2^x} = \frac{e^x}{2^{3x}}$ | $x = \frac{\ln(2) - 3\ln(2)}{\ln(2)}$ |

Find domains of the following functions:

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| 8. $\ln\left(\frac{x^2 - 1}{x + 2}\right)$ | $\{x \mid x < -2\} \cup \{x \mid x > 1\}$ |
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Differentiate the following functions and simplify, if it is possible:

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| 9. $y = e^{2x}$ | $2e^{2x}$ |
| 10. $y = \frac{1}{2}e^{3x}$ | $\frac{3}{2}e^{3x}$ |
| 11. $y = \ln(x + 2)$ | $\frac{1}{x+2}$ |
| 12. $y = \ln(x^2 - 4)$ | $\frac{2x}{x^2 - 4}$ |
| 13. $y = \frac{e^x + 2e^{2x}}{2}$ | $\frac{e^x + 4e^{2x}}{2}$ |
| 14. $y = e^x$ | e^x |
| 15. $y = e^x \sin x$ | $e^x(\sin x + \cos x)$ |
| 16. $y = \ln(x + 2)$ | $\frac{1}{x+2}$ |
| 17. $y = e^x \ln x - \frac{e^x}{x}$ | $e^x(\ln x + 1)$ |
| 18. $y = 2^{3x}$ | $3 \cdot 2^{3x} \ln 2$ |