

## Differentiating Exponentials

In Exercises 1–20, find  $dy/dx$ .

1.  $y = 2e^x$

3.  $y = e^{-3x/2}$

5.  $y = e^{2x/3}$

7.  $y = xe^x - e^x$

9.  $y = e^{\sqrt{x}}$

11.  $y = x^x$

13.  $y = x^{-\sqrt{2}}$

15.  $y = 8^x$

17.  $y = 3^{\csc x}$

19.  $y = \frac{e^x}{e^{-x} + 1}$

2.  $y = e^{x-\sqrt{2}}$

4.  $y = e^{-5x}$

6.  $y = e^{-x/4}$

8.  $y = x^2e^x - xe^x$

10.  $y = e^{(x^2)}$

12.  $y = x^{1-\sqrt{2}}$

14.  $y = x^{1-x}$

16.  $y = 9^{-x}$

18.  $y = 3^{\cos x}$

20.  $y = \frac{e^{-x}}{e^x - 1}$

## Differentiating Logarithms

In Exercises 21–40, find  $dy/dx$ .

21.  $y = \ln(x^2)$

23.  $y = \ln(1/x)$

25.  $y = \ln(x+2)$

27.  $y = \ln(2 - \cos x)$

29.  $y = \ln(\ln x)$

31.  $y = \log_2 x^2$

33.  $y = \log_2(3x+1)$

35.  $y = \log_2(1/x)$

37.  $y = \ln 2 \cdot \log_2 x$

39.  $y = \log_{10} e^x$

22.  $y = (\ln x)^2$

24.  $y = \ln(10/x)$

26.  $y = \ln(2x+2)$

28.  $y = \ln(x^2 - 1)$

30.  $y = x \ln x - x$

32.  $y = \log_5 \sqrt{x}$

34.  $y = \log_{10} \sqrt{x+1}$

36.  $y = 1/\log_2 x$

38.  $y = \log_3(1+x \ln 3)$

40.  $y = \ln 10^x$