

*Instructions:* Remember that the answer could appear in an equivalent form.

### Basic Derivatives

1.  $f'(x) = 6x - 5$

2.  $f'(x) = 0.8x^{-0.2} + 1$

3.  $f'(x) = \frac{1}{2\sqrt{x}}$

4.  $f'(x) = 5e^x$

5.  $f'(x) = \frac{1}{x}$

6.  $f'(x) = -x^{-\frac{3}{2}}$

7.  $f'(x) = \frac{1}{\ln(3)x}$

8.  $f'(x) = 9x^{-4}$

9.  $f'(x) = \ln(5)5^x$

10.  $f'(x) = \frac{-2}{x}$

11.  $f'(x) = -2e^{-2x}$

12.  $f'(x) = 60x^9 - 35x^6 + 3$

13.  $f'(x) = 1.2x^{0.2} + 0.5x^{-0.5}$

14.  $f'(x) = \frac{3}{2}x^{\frac{1}{2}} - \frac{1}{4}x^{-\frac{3}{4}}$

15.  $f'(x) = 3e^{3x} + 5e^{-5x}$

16.  $f'(x) = \ln\left(\frac{1}{2}\right) \cdot \left(\frac{1}{2}\right)^x$

17.  $f'(x) = \frac{-15}{2}x^{-\frac{5}{2}} + \frac{1}{3}x^{-\frac{4}{3}}$

18.  $f'(x) = -5x^{-6} - 3x^{-4}$

19.  $f'(x) = -14x^{-3} + 20x^{-6}$

20.  $f'(x) = \frac{1}{2}e^{\frac{1}{2}x} + 7e^x$

21.  $f'(x) = \frac{1}{\ln(3) \cdot x} - \frac{3}{\ln(2) \cdot x}$

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

23.  $f'(x) = 10x^4 - 6x^3 + 5$

24.  $f'(x) = 2.2x^{1.2} + 0.4x^{-0.8} + 0.1x^{-1.1}$

25.  $f'(x) = 5x^{-\frac{2}{7}} - \frac{6}{5}x^{-\frac{3}{5}} + 11x^{\frac{9}{2}}$

26.  $f'(x) = \ln(10) \cdot 10^x - \frac{5}{\ln(3) \cdot x}$

27.  $f'(x) = \frac{-3}{x}$

28.  $f'(x) = -3e^{-x} - \frac{1}{\ln(3) \cdot x}$

29.  $f'(x) = \frac{5}{x}$

30.  $f'(x) = 7\ln(9) \cdot 9^x - \frac{5}{x^2}$

31.  $f'(x) = -7e^{7x}$

32.  $f'(x) = -3x^{-4}$

33.  $f'(x) = \frac{3}{\ln(4) \cdot x} - \frac{5}{2\sqrt{x^7}}$

## Product and Quotient Rule

$$34. f'(x) = 8x^3 + 18x^2 - 24x - 6$$

$$35. f'(x) = \frac{3x^2 + 4x + 15}{(3x + 2)^2}$$

$$36. f'(x) = e^x + xe^x$$

$$37. f'(x) = \frac{6}{(x + 2)^2}$$

$$38. f'(x) = \frac{2e^{4x} - 3e^{3x}}{(e^x - 1)^2}$$

$$39. f'(x) = \frac{2 \ln(x)}{x}$$

$$40. f'(x) = \frac{5x^2(3 \ln(x) - 1)}{\ln^2(x)}$$

$$41. f'(x) = e^x(5x + 7)$$

$$42. f'(x) = e^x(1 + \ln(x)(x + 1))$$

$$43. f'(x) = 18x^2 - 38x + 10$$

$$44. f'(x) = \frac{10x(x + 3)}{(2x + 3)^2}$$

$$45. f'(x) = \frac{14}{(x + 2)^2}$$

$$46. f'(x) = -\frac{1}{(x - 2)^2} \quad x \neq -2$$

$$47. f'(x) = \ln(x) + 1$$

$$48. f'(x) = e^x \frac{x - 1}{x^2}$$

$$49. f'(x) = \ln(10)10^x \log(x) + \frac{10^x}{\ln(10)x}$$

$$50. f'(x) = \frac{5e^x(x - 1)}{(3e^x + 5x)^2}$$

$$51. f'(x) = \frac{e^x(x^3 - x^2 + x + 1)}{(x^2 + 1)^2}$$

## Chain Rule

$$52. f'(x) = 9(3x - 5)^2$$

$$53. f'(x) = 5e^x (e^x + 1)^4$$

$$54. f'(x) = x(x^2 + 1)^{-\frac{1}{2}}$$

$$55. f'(x) = -10e^{-2x}$$

$$56. f'(x) = \frac{2x + 2}{x^2 + 2x - 5}$$

$$57. f'(x) = \frac{e^x + 2}{e^x + 2x}$$

$$58. f'(x) = 5x(3x + 2)(3x + 5)^2$$

$$59. f'(x) = \frac{-5(2x + 7)}{(x^2 + 7x - 2)^6}$$

$$60. f'(x) = e^{x^3 - 5x + 1} (3x^2 - 5)$$

$$61. f'(x) = \frac{1}{2x\sqrt{\ln(x)}}$$

$$62. f'(x) = \frac{3}{x} (\ln(x) - 5)^2$$

$$63. f'(x) = (x^2 - 2)^{-3} - 6x^2 (x^2 - 2)^{-4}$$

$$64. f'(x) = 6xe^{3x^2 - 5} (4x^6 + 4x^4 + 4x^3 + 2x + 1)$$

$$65. f'(x) = \frac{3x^2 + 2}{2x(x^2 + 2)}$$