

Practice Assignment 3

Higher Order Derivatives, Implicit Differentiation, Exponentials & Logarithms Functions

In this third practice assignment, you will review topics from sections 2.6, 2.7, 4.1, to 4.5.

Try all problems for practice.

If you have difficulties, ask for help in class or in the instructor's office; all answers are shown in another file.

(1) Given $y = 5x^4 - 4x^5 + 6x + 10$, find $\frac{d^3y}{dx^3}\Big|_{x=-2}$

(2) Given $y = \frac{x^2 + 2}{x}$, find $\frac{d^2y}{dx^2}\Big|_{x=1}$

(3) Given $y = (2x^3 - 5)(6x^2 + 4x)$, find $\frac{d^3y}{dx^3}\Big|_{x=2}$

(4) Given $y = \frac{x + 2}{(x + 1)^2}$, find $\frac{d^3y}{dx^3}\Big|_{x=-2}$

(5) Given $y = x^{-4} + 2\sqrt{x}$, find $y'''(1)$

(6) Given $y = \frac{2x + 7}{3x}$, find $y''(-1)$

(7) Given $y = (x + \sqrt{x})(2x + 1)$, find $y''(4)$

(8) Given $y = x^{-5} + 2x^3 - x^{1/5}$, find $\frac{d^3y}{dx^3}\Big|_{x=-1}$

(9) Given $y = \frac{3x^2 - 5x}{2x^3}$, find $\frac{d^2y}{dx^2}\Big|_{x=3}$

(10) Given $y = \frac{2x - 3\sqrt{x}}{4\sqrt{x}}$, find $\frac{d^2y}{dx^2}\Big|_{x=1}$

(11) Find the slope of the tangent line to the graph of $2xy^2 - 3x^2y + 8 = 0$ at $(2, 1)$.

(12) Find the slope of the tangent line to the graph of $2x^{3/2} - y^{3/2} + 3x + 3 = 0$ at $(1, 4)$.

(13) Find the slope of the tangent line to the graph of $3xy^2 + x^3y + 3x^2 = 10$ at $(2, -1)$.

(14) Find the slope of the tangent line to the graph of $\frac{4}{x} - \frac{5}{y} = 2y + 1$ at $(-2, 1)$.

(15) Find the slope of the tangent line to the graph of $2\sqrt{y} - 3\sqrt{x} = 3$ at $x = 1$.

(16) Find the slope of the tangent line to the graph of $(y^3 + 2x)^2 = 9(x - y + 1)$ at $(1, -2)$.

(17) Find the slope of the tangent line to the graph of $\frac{2x}{x + y} = \frac{2}{3}y - 3$ at $(-1, 3)$.

(18) Find the slope of the tangent line to the graph of $\sqrt{2x + y} = 3x^2 - 4y + 7$ at $(1, 2)$.

(19) Find the slope of the tangent line to the graph of $\sqrt{y - x} = -3x^2 + 2y$ at $(1, 2)$.

(20) Find the slope of the tangent line to the graph of $y^2 + 3\sqrt{x} = y + 2x$ at $(4, 2)$.

(21) Given $y = \ln(3 - \sqrt{x})$, find $y'(4)$.

(22) Given $y = \ln\left(\frac{1 + 2x}{1 - 3x}\right)$, find $y'(0)$.

(23) Given $y = \sqrt{\ln(x) + 4x}$, find $y'(1)$.

(24) Given $y = (x^2 + 2x) \ln(x^2)$, find $y'(1)$.

(25) Given $y = 3x \left(\ln(2x - x^2)\right)^2$, find $y'(1)$.

(26) Given $y = \sqrt[3]{x + \ln(x)}$, find $y'(1)$.

(27) Given $y = \frac{x-2}{x+\ln(x)}$, find $y'(1)$.

(28) Given $x + y^2 + \ln(2x - y) = 2$, find $y'(1, 1)$.

(29) Given $\ln(y^2) + x^3 = \ln(3x^2 - 2)$, find $y'(1, 1)$.

(30) Given $y = \frac{3}{1+2e^{3x}}$, find $y'(0)$.

(31) Given $y = \sqrt{2x + e^x}$, find $y'(0)$.

(32) Given $y = x^2 e^{1-x}$, find $y'(1)$.

(33) Given $y = e^{x^2-2x}$, find $y'(2)$.

(34) Given $y = \ln\left(2(x+1)e^{3x}\right)$, find $y'(0)$.

(35) Given $y = (2x^3 - x)^{x-2}$, find $y'(1)$.

(36) Given $y = (x^2 - 8)^{x^2}$, find $y'(3)$.

(37) Given $y = \ln\left(\frac{e^{3-x}}{x-2}\right)$, find $y'(3)$.

(38) Given $e^{y^2-1} + e^{x-2y} = 2(x-y)$, find $y'(2, 1)$.

(39) Given $\ln\left((x-1)e^y\right) + x = 2e^{3y}$, find $y'(2, 0)$.

(40) Given $e^{xy} + y^2 = 3e^x - y$, find $y'(0, -2)$.

(41) Given $y = 8x^5 - 12x^6 - 5x + 10$, find $\frac{d^3y}{dx^3}\Big|_{x=-1}$

(42) Given $y = \frac{3-x^2}{x}$, find $\frac{d^2y}{dx^2}\Big|_{x=2}$

(43) Given $y = (3x^2 + 4x)(x^3 - 5)$, find $\frac{d^3y}{dx^3}\Big|_{x=1}$

(44) Given $y = \frac{x-3}{(x-1)^2}$, find $\frac{d^3y}{dx^3}\Big|_{x=-2}$

(45) Given $y = x^{-3} - 3\sqrt{x}$, find $y'''(4)$

(46) Given $y = \frac{4x+5}{6x}$, find $y''(3)$

(47) Given $y = (3x-1)(2x+\sqrt{x})$, find $y''(1)$

(48) Given $y = x^{-4} - 3x^2 + x^{1/3}$, find $\frac{d^3y}{dx^3}\Big|_{x=1}$

(49) Given $y = \frac{4x^3+3x}{3x^2}$, find $\frac{d^2y}{dx^2}\Big|_{x=-3}$

(50) Given $y = \frac{2\sqrt{x}-5x}{3\sqrt{x}}$, find $\frac{d^2y}{dx^2}\Big|_{x=1}$

(51) Find the slope of the tangent line to the graph of $4x^2y - 3xy^2 + 45 = 0$ at $(3, -1)$.

(52) Find the slope of the tangent line to the graph of $x^{4/3} + 2y^{4/3} + 2y = 5$ at $(1, 1)$.

(53) Find the slope of the tangent line to the graph of $2x^2y - 4xy^3 + 2x = 24$ at $(-3, 1)$.

(54) Find the slope of the tangent line to the graph of $\frac{2}{y} + \frac{3}{x} = 5$ at $x = 1$.

(55) Find the slope of the tangent line to the graph of $3\sqrt{y} + 2\sqrt{x} = 9$ at $x = 9$.

(56) Find the slope of the tangent line to the graph of $(y^2 + 5x)^2 = 6y + 30$ at $(1, 1)$.

- (57) Find the slope of the tangent line to the graph of $5\sqrt{x} - \sqrt{y} - 2x = y - 4$ at $(4, 4)$.
- (58) Find the slope of the tangent line to the graph of $x^2 + y^2 = \sqrt{-y - 2x} + 1$ at $(-1, 1)$.
- (59) Find the slope of the tangent line to the graph of $\sqrt[3]{x} + 2\sqrt[3]{y} = 7 - 4y$ at $(1, 1)$.
- (60) Find the slope of the tangent line to the graph of $x^3 + 3\sqrt{y} = 2y - 5x + 4$ at $(1, 4)$.
- (61) Given $y = \ln(\sqrt{x} - 1)$, find $y'(4)$.
- (62) Given $y = \ln\left(\frac{4x - 1}{2x - 1}\right)$, find $y'(0)$.
- (63) Given $y = \sqrt{5x + \ln(x) - 1}$, find $y'(1)$.
- (64) Given $y = (3x - x^2) \ln(3 - 2x)$, find $y'(1)$.
- (65) Given $y = 2x \left(\ln(x^3 + 2)\right)^3$, find $y'(-1)$.
- (66) Given $y = \sqrt[5]{x - 2 \ln x}$, find $y'(1)$.
- (67) Given $y = \frac{4 - x}{x^2 + \ln(x)}$, find $y'(1)$.
- (68) Given $\ln(y - x) + 6x^2 = y^2 + 2$, find $y'(1, 2)$.
- (69) Given $\ln(x^2) + y^2 = \ln(2 - y) + 1$, find $y'(1, 1)$.
- (70) Given $y = \frac{4}{1 - 3e^{2x}}$, find $y'(0)$.
- (71) Given $y = \sqrt{2x^2 + e^x}$, find $y'(0)$.
- (72) Given $y = (x^2 + 1)e^{2-x}$, find $y'(2)$.
- (73) Given $y = e^{x^3 - x}$, find $y'(-1)$.
- (74) Given $y = \ln\left((x^2 + 1)e^{2x}\right)$, find $y'(0)$.
- (75) Given $y = (5 - x^2)^{x+1}$, find $y'(2)$.
- (76) Given $y = (2 + x^3)^{x^3}$, find $y'(-1)$.
- (77) Given $y = \ln\left(\frac{x + 4}{e^{x+2}}\right)$, find $y'(-2)$.
- (78) Given $e^{2x+y} - 2x^2 = y + e^{2+y}$, find $y'(1, -2)$.
- (79) Given $y^2 + e^{3x^2 + \ln(y)} = 2 \ln(x + y)$, find $y'(0, 1)$.
- (80) Given $2e^y + 3x^2 = 4e^{x-1} + x$, find $y'(1, 0)$.
- (81) Given $y = xe^{2x}$, find $\left.\frac{d^3y}{dx^3}\right|_{x=0}$.
- (82) Given $y = x \ln(x)$, find $\left.\frac{d^3y}{dx^3}\right|_{x=3}$.
- (83) Given $y = \frac{2x}{e^x}$, find $\left.\frac{d^3y}{dx^3}\right|_{x=0}$.
- (84) Given $y = \frac{\ln(x)}{3x}$, find $\left.\frac{d^3y}{dx^3}\right|_{x=1}$.
- (85) Given $y = (x^2 + 4)e^x$, find $\left.\frac{d^3y}{dx^3}\right|_{x=0}$.
- (86) Given $y = (x^2 + 1) \ln(x)$, find $\left.\frac{d^3y}{dx^3}\right|_{x=2}$.
- (87) Given $y = \frac{\ln(\sqrt{x})}{x^2}$, find $y'''(1)$.
- (88) Given $y = \ln(e^x + 3)$, find $y^{(3)}(0)$.

(89) Given $y = e^{\sqrt{x+1}}$, find $y''(4)$

(90) Given $y = \ln(\sqrt{x^3 + 3})$, find $y''(1)$

(91) Given $e^{xy} - xe^y + 2ye^x + 3x - 4 = 0$, find $y'(0, 0)$.

(92) Given $\ln(xy) + 4\sqrt{x} - \frac{x}{\sqrt{y}} + 3\ln(y) - 3 = 0$, find $y'(1, 1)$.

(93) Given $\sqrt{3e^x + e^y} - \ln\left(\frac{x+1}{y+1}\right) + 3x^2 - 2y^2 - 2 = 0$, find $y'(0, 0)$.

(94) Given $e^{\sqrt{y-1}} + \ln\left(\frac{y+1}{\sqrt{x}}\right) + 4\sqrt{x} - 5 = 0$, find $y'(4, 1)$.

(95) Given $3x\sqrt{y} - 4\ln\left(\frac{x}{y}\right) + 4x^3 - 5y - 2 = 0$, find $y'(1, 1)$.

(96) Given $y = (3e^x + x^2)^{3x+1}$, find $y'(0)$.

(97) Given $y = (2\ln x + 3)^{2x}$, find $y'(1)$.

(98) Given $y = (x^2 + 4)^{e^x}$, find $y'(0)$.

(99) Given $y = (2\sqrt{x} + 1)^{e^{x-1}}$, find $y'(1)$.

(100) Given $y = (x^3 + 1)^{2+\ln x}$, find $y'(1)$.