Suggested Homework for Lecture 3

Math 116

(1) Find the derivative of each of the following functions:

(1a) $x^3 + 3x^2 + 5x + 17$

(1b) $x^4 + 4x^2 + 12x + \pi$

(1c) $\frac{x^4}{4} + \frac{x^3}{2} + 2x$

(1d) $\frac{x^6}{3} + \frac{x^4}{2} + 3x + e$

(2) For each of the following functions $f(x)$, find $f'(x)$.

(2a) $f(x) = x^{-1} + x^2$

(2b) $f(x) = -x^{-3} + 2x$

(2c) $f(x) = \frac{3}{x^2}$

(2d) $f(x) = \frac{1}{x} - \frac{1}{x^4}$

(3) For each of the following functions $f(x)$, find $\frac{d}{dx} f(x)$.

(3a) $f(x) = x^{3/2}$

(3b) $f(x) = x^{4/5} + x^{2/3}$

(3c) $f(x) = \sqrt{x} + \sqrt[3]{x}$

(3d) $f(x) = 2\sqrt{x} + \frac{1}{\sqrt{x}}$

(4) Compute the derivative of each of the following functions.

(4a) $e^x + \ln(x)$

(4b) $5e^x + x^2 + \frac{1}{x}$

(4c) $4\ln(x) + x^3 + 1$

(4d) $e^x + x^e$

(5) Find the tangent line to the curve at the given x-value.

(5a) $y = x^3 - x, \quad x = 1$

(5b) $y = 3x^4 - \frac{1}{x}, \quad x = 1$

(5c) $y = e^x + x, \quad x = 0$

(5d) $y = \frac{1}{x^2}, \quad x = 2$

Answers to Suggested Homework for Lecture 3

Math 116

(1a) $3x^2+6x+5$
(1b) $4x^3+8x+12$
(1c) $x^3+\frac{3x^2}{2}+2$
(1d) $2x^5+2x^3+3$

(2a) $-x^{-2}+2x$
(2b) $3x^{-4}+2$
(2c) $-\frac{6}{x^3}$
(2d) $-\frac{1}{x^2}+\frac{4}{x^5}$

(3a) $\frac{3}{2}x^{1/2}$
(3b) $\frac{4}{5}x^{-1/5}+\frac{2}{3}x^{-1/3}$
(3c) $\frac{1}{2\sqrt{x}}+\frac{1}{3\sqrt[3]{x^2}}$
(3d) $\frac{1}{\sqrt{x}}-\frac{1}{2\sqrt{x^3}}$

(4a) $e^x+\frac{1}{x}$
(4b) $5e^x+2x-\frac{1}{x^2}$
(4c) $\frac{4}{x}+3x^2$
(4d) e^x+ex^{e-1}

(5a) $y=2x-2$
(5b) $y=13x-11$
(5c) $y=2x+1$
(5d) $y=-\frac{x}{4}+\frac{3}{4}$