

Lab 2: Derivatives and Integration

1. find the derivatives for the following functions:

(1) $y = \frac{1}{x^2}$

(2) $y = \frac{1}{\sqrt{x}}$

(3) $y = 3x^2 - \frac{2}{x^2} + 5$

(4) $y = \cos(2x^2)$

(5) $y = 3\ln x - \frac{2}{x}$

(6) $y = (2x + 5)^4$

(7) $y = \ln(1 - x)$

(8) $y = e^{x^2+2x}$

(9) $y = (1 + \sin^2 x)^4$

(10) $y = \sin \sqrt{1 + x^2}$

2. find the value of the integration for the functions below:

(1) $\int \frac{(x-1)^3}{x^2} dx$

(2) $\int \frac{dx}{x^2 \sqrt{x}}$

(3) $\int x\sqrt{x} dx$

(4) $\int (x+1)^2 dx$

(5) $\int ((e^x - 3\cos(x))) dx$

(6) $\int_a^b x dx$, where $a < b$.

(7) $\int_0^1 e^x dx$

(8) $\int_1^4 (x^2 + 1) dx$

(9) $\int_{\frac{\pi}{4}}^{\frac{5\pi}{4}} (1 + \sin^2 x) dx$

(10) $\int_0^{2\pi} \cos x dx$