



Mathematik I für Biochemie, Molekulare Medizin, Lehramt, Chemie

Vorlesung: Fr 12-14, O25/H1 (Biochemie, MolMed); Mo 8-10, O25/H1 (Lehramt,
Chemie)

Die Übungsblätter können von <http://www.uni-ulm.de/nawi/nawi-theochemie/lehre/> heruntergeladen werden.

1 Übung: Differenzialquotienten

1.1 Algebraische Ausdrücke

1. $y = 4 + 2x - 3x^2 - 5x^3 - 8x^4 + 9x^5$; $y' = ?$
2. $y = \frac{1}{x} + \frac{3}{x^2} + \frac{2}{x^3}$; $y' = ?$
3. $f(x) = \sqrt{x^2 + 6x + 3}$; $f'(x) = ?$
4. $y = (x^2 + 3)^4 (2x^3 - 5)$; $y' = ?$
5. $y = \frac{x}{\sqrt{x-1}}$; $y'' = ?$
6. $y = \frac{x^3 + 3x^2 + 3x + 1}{x^3 - x^2 - x + 1}$; $y' = ?$
7. $x = \frac{t^3 + 2t^5}{t^4}$; $\ddot{x} = ?$
8. $y = \frac{a-x}{\sqrt{a^2-x^2}}$; $y' = ?$
9. $y = \frac{(a^2-2x)^3}{(a+\sqrt{2x})^3}$; $y' = ?$
10. $y = \frac{2x+3}{4x^2+12x+9}$; $y' = ?$

1.2 Trigonometrische Funktionen

1. $y = \sin x - x \cos x + x^2 + 4x + 3$
2. $y = \frac{1}{2} \tan x \sin 2x$
3. $y = x^2 \sin x + 2x \cos x - 2x \sin x$
4. $y = x \cos \left(\frac{1-x^2}{1-x} \right)$
5. $y = \frac{\sin x}{x} + \frac{x}{\sin x}$
6. $y = \frac{1}{3} \sin^3 x - \frac{2}{5} \sin^5 x + \frac{1}{7} \sin^7 x$
7. $y = \frac{3 \cos^2 x}{\sin^3 x}$
8. $y = \tan x + \cot x$
9. $y = \sin^2 x + \cos^2 x$

1.3 Logarithmische Ausdrücke, Exponentialfunktionen

1. $y = \ln [(x^3 + 2)(x^2 + 3)]$; $y' = ?$
2. $y = \exp \left[- \frac{(x^2 - 2x + 1)}{x - 1} \right]$; $y' = ?$
3. $y = e^{-x^2 \sin x}$; $y' = ?$
4. $y = x^x$; $y' = ?$
5. $y = e^{\ln 3x^2}$; $y'' = ?$
6. $y = \ln [\ln (\ln x)]$; $y' = ?$
7. $y = x^{(x^x)}$; $y' = ?$
8. $y = (x^x)^x$; $y' = ?$
9. $y^2 = \ln \left[\frac{x^4}{(3x - 4)^2} \right]$; $y' = ?$