Cvičné příklady na derivace k předmětu MA1 – Tereza Kovářová

Derivujte:

1. $y = \sin x + \cos x$ $[y' = \cos x - \sin x]$
2. $y = x^4 + 3x^2 - 2$ $[y' = 4x^3 + 6x]$
3. $y = \frac{x}{2} - \arctan x$ $[y' = \frac{1}{2} - \frac{1}{1+x^2}]$
4. $y = 100^x$ $[y' = \ln 100 \cdot 100^x]$
5. $y = \frac{2}{x} - \frac{3}{x^2} + 2\ln x$ $[y' = -\frac{2}{x^2} + \frac{6}{x^3} + \frac{2}{x}]$
6. $y = \sqrt{x}$ $[y' = \frac{1}{2\sqrt{x}}]$
7. $y = \sqrt[6]{x}$ $[y' = \frac{1}{6}\frac{1}{\sqrt[6]{x^5}}]$
8. $y = x^{\frac{4}{7}} + \frac{2}{3}x^{-\frac{1}{3}}$ $[y' = \frac{4}{7}x^{-\frac{3}{7}} - \frac{2}{9}x^{-\frac{4}{3}}]$

Určete derivaci součinu funkcí

1. $y = x \cdot x$ $[y' = 1 \cdot x + x \cdot 1 = 2x]$
2. $y = x\cos x$ $[y' = \cos x - x\sin x]$
3. $y = \sin x \cos x$ $[y' = \cos^2 x - \sin^2 x = \cos 2x]$
4. $y = xa^x$ $[y' = a^x + xa^x \ln a]$
5. $y = x\ln x$ $[y' = \ln x + 1]$
6. $y = x\log_4 x$ $[y' = \log_4 x + \frac{1}{\ln 4}]$
7. $y = x\sin x \ln x$ $[y' = \sin x \ln x + x\cos x \ln x + \sin x]$
8. $y = (x^2 + x)\log_7 x$ $[y' = 2x\log_7 x + \frac{x+1}{\ln 7}]$
9. $y = x^2 e^{-x}\arctan x$ $[y' = x^2 e^{-x}(\frac{2e^{-x}}{x}\arctan x - \arctan x + \frac{1}{1+x^2})]$
10. $y = \sqrt{x}(2x^3 + 3\sqrt[3]{x} + 2)$ $[y' = 7\sqrt{5} + \frac{21}{10}\frac{1}{\sqrt[10]{x^3}} + \frac{1}{\sqrt{x}}]$

Určete derivaci podílu funkcí

1. $y = \frac{1}{x}$ $[y' = \frac{-1}{x^2}]$
2. $y = \frac{x+1}{x}$ $[y' = \frac{-1}{x^2}]$
3. $y = \tan x = \frac{\sin x}{\cos x}$ $[y' = \frac{1}{\cos^2 x}$
4. $y = \operatorname{cotg} x$ $[y' = \frac{-1}{\sin^2 x}]$
5. $y = \frac{2x^3+3x^2-1}{4x^2-x}$ $[y' = \frac{(6x^2+6x)(4x^2-x)-(2x^3+3x^2-1)(8x-1)}{(4x^2-x)^2}]$
6. $y = \frac{x}{\sqrt{1+x^2}}$ $[y' = \frac{1}{(1+x^2)^{\frac{3}{2}}}]$
7. $y = \frac{\sin x}{1+\cos x}$ $[y' = \frac{1}{1+\cos x}]$
8. $y = \frac{\cos x}{e^x}$ $[y' = -\frac{\sin x + \cos x}{e^x}]$