

Izvod - domaći zadatak

1. Odrediti izvode sledećih funkcija po definiciji:

$$f(x) = e^{3x}; \quad f(x) = \ln x; \quad f(x) = x^2, f'(2); \quad f(x) = \frac{1}{x}, f'(1); \quad f(x) = \sqrt{x}; \quad f(x) = \operatorname{tg} 2x, f'(0); \quad f(x) = x \sin x;$$

$$f(x) = x \ln(2x + 1), f'(2); \quad f(x) = (2x - 1)3^{2x};$$

$$f(x) = 5x \cos 2x - 3e; \quad f(x) = xe^{3x} - 2e; \quad f(x) = xe^{4x} - \ln 5\pi; \quad f(x) = 5^{4x} \sqrt[3]{x+2}; \quad f(x) = x \ln(\sin x)$$

2. Odrediti izvode sledećih funkcija:

$$f(x) = x^5 + 3x^{\frac{1}{2}} - \arcsin x + 5 \ln x; \quad f(x) = \sqrt{x} - \frac{2}{\sqrt{x}} + \frac{3}{x^4} - \frac{1}{5x^5} + 4; \quad f(x) = x^2 \sqrt[3]{x^4} + \frac{x^5}{\sqrt[6]{x^4}} + \frac{1}{\sqrt[3]{x^3}}; \quad f(x) = \frac{x^2+1}{x^2-1};$$

$$f(x) = \frac{1-\sqrt{x}}{1+\sqrt[3]{x}}; \quad f(x) = \frac{\operatorname{ctg} x}{x \log_2 x} + 3xe^x; \quad f(x) = (2-x^2) \cos x + 2x \sin x; \quad f(x) = \frac{\sin x - x \cos x}{\cos x + x \sin x};$$

$$f(x) = \frac{\arcsin x}{x}; \quad f(x) = \frac{\sqrt{x}}{\ln x}; \quad f(x) = \frac{\cos x}{1+\operatorname{tg} x}; \quad f(x) = \frac{\sin x}{x^2} + e^x \cos x - (x^2 + 2) \ln x; \quad f(x) = \frac{(x+1)^2}{(x-1)^3}$$

3. Odrediti izvode sledećih funkcija:

$$f(x) = 2^{\frac{\sin x}{x}}; \quad f(x) = \frac{1}{5x^2}; \quad f(x) = \sqrt{xe^x + x}; \quad f(x) = \log_3 \frac{1}{\cos^2 x}; \quad f(x) = \arcsin \frac{x-1}{x}; \quad f(x) = \arccos(\ln \sqrt{1-x});$$

$$f(x) = e^{\operatorname{ctg}^2(x^2+3)}; \quad f(x) = \ln(\operatorname{tg} x); \quad f(x) = \ln(\ln(x^2+1)); \quad f(x) = 3 \ln \frac{x-1}{x+1}; \quad f(x) = \cos^3 x - \frac{1}{\cos^3 x}; \quad f(x) = 2^{\operatorname{arctg} \sqrt{x}};$$

$$f(x) = 4^{-\log_7 \sqrt{1+x^2}}; \quad f(x) = \ln\left(\operatorname{arctg}\left(\frac{1+x}{1-x}\right)\right); \quad f(x) = \ln \operatorname{tg} \frac{2x+1}{4}; f(x) = \log_3^2(x+4) - \ln(\ln x);$$

$$f(x) = \operatorname{arctg} \frac{2}{x^2} + \sin(2x) e^{\sin x}; \quad f(x) = \sqrt{1 + \sin x} (1 - \sin x); \quad f(x) = \ln(e^{2x} + \sqrt{e^{4x} + 1}); \quad f(x) = \frac{1}{2} \ln\left(\operatorname{tg} \frac{x}{2}\right) - \frac{\cos x}{2 \sin^2 x};$$

$$f(x) = \ln\left(\frac{1+\sqrt{\sin x}}{1-\sqrt{\sin x}}\right) + \operatorname{arctg} \sqrt{\sin x}; \quad f(x) = \operatorname{arctg}(\ln x) + \ln(\operatorname{arctg} x); \quad f(x) = \ln\left(\cos \frac{x-1}{x}\right); \quad f(x) = (x^5 + 2^{3x}) \arccos(x^2 + 5)$$

4. Odrediti izvode sledećih funkcija:

$$x^2 + xy + y^2 + 6 = 0; \quad \ln xy = x + y; \quad x \cos y + y = 5x; \quad x^3 + y^3 = 3xy; \quad xy + \sin y = e^{x+y}; \quad x^2 y^3 = y + 2x^3;$$

$$\ln xy = x + y; \quad \ln x + e^{-\frac{y}{x}} = 0; \quad \operatorname{tg} y = xy; \quad y^3 = \frac{x-y}{x+y}; \quad e^x \sin y + e^y \cos x = 0; \quad e^{x^2+y^2} = \operatorname{arctg} \frac{y}{x}; \quad xy = 5(x+y) - 3^{xy};$$

$$\frac{3+x^2 y^3}{1+y} - 5x \ln y = 9; \quad \sqrt[3]{1+y} + \ln(xy) = \frac{x}{y}$$

5. Odrediti izvode sledećih funkcija:

$$f(x) = x^{x+5}; \quad f(x) = \left(\frac{\ln x}{x}\right)^{\sin x}; \quad f(x) = (\sin x)^{\ln x}; \quad f(x) = \frac{(\ln x)^x}{x^{\ln x}}; \quad f(x) = (x^2 - 3)$$

$$f(x) = x^{x^3}; \quad f(x) = e^{\cos x} (\cos x)^{x^2}; \quad f(x) = \frac{(\cos x)^{\sin x}}{x^2+3}; \quad f(x) = \sqrt{x}$$

6. Odrediti drugi izvod sledećih funkcija:

$$f(x) = \arcsin \frac{2x}{1+x^2}; \quad f(x) = (x-2)e^{2x}; \quad f(x) = e^{-x^2}; \quad f(x) = e^x \cos x; \quad f(x) = e^x \sin x; \quad f(x) = \operatorname{arctg} \frac{1+x}{1-x};$$

$$f(x) = \ln(x + \sqrt{1+x^2})$$

7. Primenom izvoda odrediti sledeće granične vrednosti:

$$\lim_{x \rightarrow 0} x^2 e^{\frac{1}{x^2}} \quad \lim_{x \rightarrow -\infty} \left(x - x e^{\frac{1}{x-2}}\right) \quad \lim_{x \rightarrow 0} \arcsin x \operatorname{ctg} x \quad \lim_{x \rightarrow +\infty} \left(x e^{\frac{1}{x}} - x\right)$$

$$\lim_{x \rightarrow 0} \left(\frac{1}{x \sin x} - \frac{1}{x^2}\right) \quad \lim_{x \rightarrow 0+} \left(\frac{\sin x}{x}\right)^{\frac{1}{x^2}} \quad \lim_{x \rightarrow 0+} \frac{\ln(\sin 3x)}{\ln(e^{2x}-1)} \quad \lim_{x \rightarrow 0+} \frac{\ln(\ln(1+5x))}{\ln(\sqrt{1+8x}-1)}$$

$$\lim_{x \rightarrow 0} \frac{\sqrt[3]{\cos^5 x} - \sqrt[3]{\cos^7 x}}{e^{x^2} + \ln(x^2 + e^{-1})} \quad \lim_{x \rightarrow 0} \frac{e^{\cos x} - e^{\sqrt[5]{x^2+1}}}{\ln(1+\sin^2 x)} \quad \lim_{x \rightarrow 0} \frac{\sin 5x \ln(1-3x)}{5x^2 - 3x^2}$$

$$\lim_{x \rightarrow 0} \frac{(\sqrt[3]{1-5x}-1) \ln(1-7x)}{2x^2 - 3x^2} \quad \lim_{x \rightarrow +\infty} \frac{\ln x}{x^7} \quad \lim_{x \rightarrow 0} \frac{\operatorname{tg} x - x}{x - \sin x} \quad \lim_{x \rightarrow a} \frac{\cos x \ln(x-a)}{\ln(e^x - e^a)}$$