

Zadatak 6. Izračunaj vrijednost prve derivacije funkcije f u točki x_0 , ako je:

$$1) f(x) = \frac{x}{e^x}, x_0 = -2;$$

$$2) f(x) = \frac{3^x}{x^2}, x_0 = -1;$$

$$3) f(x) = \frac{\ln(1-x)}{1-x}, x_0 = 0;$$

$$4) f(x) = \log_2(3-2x), x_0 = 1.$$

Rješenje.

$$1) f'(-2) = \frac{e^x - xe^x}{e^{2x}} = \frac{1}{e^x} - \frac{x}{e^x} = \frac{1}{e^{-2}} + \frac{2}{e^{-2}} = e^2 + 2e^2 = 3e^2;$$

$$2) f'(-1) = \frac{3^x \cdot \ln 3 \cdot x^2 - 2x \cdot 3^x}{x^4} = \frac{3^x x(x \ln 3 - 2)}{x^4} = \frac{3^x(x \ln 3 - 2)}{x^3} = \frac{3^{-1}(-1 \ln 3 - 2)}{(-1)^3} = \frac{2 + \ln 3}{3};$$

$$3) f'(0) = \frac{[\ln(1-x)]'(1-x) - \ln(1-x)(1-x)'}{(1-x)^2} = \frac{\frac{1}{1-x} \cdot (-1) \cdot (1-x) + \ln(1-x)}{(1-x)^2} = \frac{\ln(1-x) - 1}{(1-x)^2} = \frac{\ln 1 - 1}{1} = -1;$$

$$4) f'(1) = \frac{1}{(3-2x) \ln 2} \cdot (-2) = -\frac{2}{(3-2 \cdot 1) \ln 2} = \frac{-2}{\ln 2}.$$