DZ (4)

1. Provjeri je li F primitivna funkcija od funkcije f, ako je:

a) $F(x) = \sin(2x+3) \cdot \ln(x^2)$, $f(x) = 2\big(\cos(2x+3)\ln(x^2) + \frac{\sin(2x+3)}{x}\big)$

b) $F(x) = x^5 + \sqrt{x^5}$, $f(x) = 5x^4(1 + \frac{1}{2\sqrt{x^5}})$

2. Koristeći metodu neposredne integracije, integriraj:

a) $\int (x^3 + x\sqrt{x} - 15\sin x + 4)dx \qquad (\frac{x^4}{4} + \frac{2x^{5/2}}{5} + 15\cos x + 4x + C)$

b) $\int (\frac{2}{x^2} - \frac{3}{x} + \frac{1}{\sqrt[3]{x^2}} - \frac{e^x}{4})dx \qquad (\frac{-2}{x} - 3\ln x + 3\sqrt[3]{x} - \frac{1}{4}e^x + C)$

c) $\int \frac{x}{x+1}dx \qquad (x - \ln x + C)$

d) $\int \frac{x^2+2}{x^2-1}dx \qquad (x + \frac{3}{2}\ln|\frac{x-1}{x+1}| + C)$

3. Koristeći metodu supstitucije, integriraj:

a) $\int e^{\cos x}\sin x dx \qquad (\text{Rj: } -e^{\cos x} + C)$

b) $\int \operatorname{ctg} x dx \qquad (\ln(\sin x) + C)$

c) $\int e^{5x+7}dx \qquad (\frac{1}{5}e^{5x+7} + C)$

d) $\int 3x^5 e^{x^6}dx \qquad (\frac{1}{2}e^{x^6} + C)$

e) $\int \dfrac{dx}{x^2 + 8x + 17} \qquad (\operatorname{arctg}(x+4) + C)$

f) $\int \frac{dx}{\sqrt{a^2 - x^2}}$ $\quad (\arcsin(\frac{x}{a}) + C)$

g) $\int \frac{\cos x}{\sin^4 x} dx$ $\quad (-\frac{1}{3\sin^3 x} + C)$

h) $\int \frac{e^x}{\sqrt{1 + 2e^x}} dx$ $\quad (\sqrt{1 + 2e^x} + C)$