

ANALIZA 1
23. domača naloga

(1) Izračunaj naslednje integrale

(a) $\int \frac{1 - \sqrt{x+1}}{1 + \sqrt[3]{x+1}} dx$	(b) $\int \frac{dx}{\sqrt{1-4x-x^2}}$	(c) $\int \sqrt{x^3+x^4} dx$
(d) $\int \frac{\cos x}{1 + \cos x} dx$	(e) $\int \frac{dx}{\cos^4 x \sin^4 x}$	(f) $\int \sin(3x) \sin(\pi x) dx$
(g) $\int \frac{\sin^4 x}{\cos^3 x} dx$	(h) $\int \frac{\cos 3x}{\cos^2 x} dx$	(i) $\int \frac{1}{3 - 3 \sin^2 x + 5 \cos x} dx$
(j) $\int \cos \sqrt{5x} dx$	(k) $\int e^{\sin x} \sin 2x dx$	(l) $\int (x - \sin x)^3 dx$
(m) $\int \frac{e^{2x}}{\operatorname{sh}^4 x} dx$	(n) $\int \frac{e^x(1+e^x)}{\sqrt{1-e^{2x}}} dx$	(o) $\int \operatorname{sh} x \sqrt[3]{\frac{1+\operatorname{ch} x}{2+\operatorname{ch} x}} dx$
(p) $\int \frac{\ln x}{(1+x)^2} dx$	(q) $\int \frac{\ln \cos x}{\cos^2 x} dx$	(r) $\int \frac{\arcsin x}{x^2} dx$
(s) $\int e^{2x} \sin(e^x) dx$	(t) $\int \operatorname{ch} x \cos x dx$	(u) $\int \frac{x^3 \arccos x}{\sqrt{1-x^2}} dx$

(a) $6 \left(-\frac{(x+1)^{7/6}}{7} + \frac{(x+1)^{5/6}}{5} + \frac{(x+1)^{2/3}}{4} - \frac{\sqrt{x+1}}{3} - \frac{\sqrt[3]{x+1}}{2} + \sqrt[6]{x+1} + \frac{\ln(1+\sqrt[3]{x+1})}{2} - \operatorname{arctg} \sqrt[6]{x+1} \right)$	(c) $\left(\frac{x^2}{3} + \frac{x}{12} - \frac{1}{8} \right) \sqrt{x^2+x} + \frac{\ln x+\frac{1}{2}+\sqrt{x^2+x} }{16}$
(b) $\arcsin \frac{x+2}{\sqrt{5}}$	(e) $\frac{1}{3}(\operatorname{tg}^3 x - \operatorname{ctg}^3 x) + 3(\operatorname{tg} x - \operatorname{ctg} x)$
(d) $x + \operatorname{ctg} x - \frac{1}{\sin x}$	(g) $\sin x + \frac{\sin x}{2 \cos^2 x} + \frac{3}{4} \ln \frac{1 - \sin x}{1 + \sin x}$
(f) $\frac{\sin(\pi-3)x}{2\pi-6} - \frac{\sin(\pi+3)x}{2\pi+6}$	(i) $\frac{1}{5} \ln \left \frac{\operatorname{tg} \frac{x}{2} + 1}{\operatorname{tg} \frac{x}{2} - 1} \right - \frac{3}{10} \operatorname{arctg} \frac{\operatorname{tg} \frac{x}{2}}{2}$
(h) $4 \sin x + \frac{3}{2} \ln \frac{1 - \sin x}{1 + \sin x}$	(k) $2e^{\sin x}(\sin x - 1)$
(j) $\frac{2}{5}(\sqrt{5x} \sin \sqrt{5x} + \cos \sqrt{5x})$	(l) $\frac{x^4+3x^2}{4} + 3x^2 \cos x - 6x \sin x - \frac{3}{4}x \sin 2x - 5 \cos x - \frac{3}{8} \cos 2x - \frac{\cos^3 x}{3}$
(m) $-\frac{8}{3} \frac{3e^{4x} - 3e^{2x} + 1}{(e^{2x} - 1)^3}$	(n) $\arcsin e^x - \sqrt{1 - e^{2x}}$
(o) $-\frac{2}{3} \frac{1}{t-1} + \frac{2t+1}{t^2+t+1} + \frac{1}{6} \ln \frac{(t-1)^2}{t^2+t+1} - \frac{7}{3\sqrt{3}} \operatorname{arctg} \frac{2t+1}{\sqrt{3}}, \text{ kjer je } t = \sqrt[3]{\frac{1+\operatorname{ch} x}{2+\operatorname{ch} x}}$	(p) $\ln \left \frac{x}{x+1} \right - \frac{\ln x}{1+x}$
(q) $\operatorname{tg} x(1 + \ln \cos x) - x$	(r) $-\frac{\arcsin x}{x} + \frac{1}{2} \ln \frac{1 - \sqrt{1-x^2}}{1 + \sqrt{1-x^2}}$
(s) $\sin e^x - e^x \cos e^x$	(t) $\frac{1}{2}(\operatorname{sh} x \cos x + \operatorname{ch} x \sin x)$
(u) $-\frac{(2+x^2)\sqrt{1-x^2}}{3} \arccos x - \frac{x^3+6x}{9}$	

(2) Izračunaj limito

$$\lim_{n \rightarrow \infty} \frac{1 + \sqrt[n]{e} + \sqrt[n]{e^2} + \dots + \sqrt[n]{e^{n-1}}}{n}.$$

$e - 1$

(3) Izračunaj limito

$$\lim_{n \rightarrow \infty} \frac{\ln \frac{n+(e-1)}{n} + 2 \ln \frac{n+2(e-1)}{n} + 3 \ln \frac{n+3(e-1)}{n} + \dots + n \ln \frac{n+n(e-1)}{n}}{n^2}.$$

$\frac{e^2-3}{4(e-1)^2}$