Математика 2 - 19/20 - Домаћи 2 (смене 1, 2, 5, 6)

Израчунати интеграле:

1. $\int \frac{1}{x}\sqrt{\frac{1-x}{1+x}}dx$ $\qquad \left(\ln\left|\frac{\sqrt{1-x^2}-1}{x}\right| + 2\operatorname{arctg}\sqrt{\frac{1-x}{1+x}} + C\right)$

2. $\int \frac{x-1}{\sqrt[3]{2x+1}}dx$ $\qquad \left(\frac{3}{20}(2x+1)^{5/3} - \frac{9}{8}(2x+1)^{2/3} + C\right)$

3. $\int \frac{x}{x^2-2x-3}\sqrt{\frac{4x-2}{2x-1}}dx$ $\qquad \left(\frac{1}{2\sqrt{2}}\ln|(x-3)^3(x+1)| + C\right)$

4. $\int \sqrt{x^2+1}dx$ $\qquad \left(\frac{1}{8}\left(x+\sqrt{x^2+1}\right)^2 + \frac{1}{2}\ln\left(x+\sqrt{x^2+1}\right) - \frac{1}{8}\frac{1}{\left(x+\sqrt{x^2+1}\right)^2} + C\right)$

5. $\int \frac{dx}{\sqrt{x^2+x+1}}$ $\qquad \left(\ln\left(\frac{2x+1}{\sqrt{3}} + \sqrt{\left(\frac{2x+1}{\sqrt{3}}\right)^2+1}\right) + C\right)$

6. $I = \int \sqrt{2x^2-3}dx$

   $\left(A = x\sqrt{\frac{2}{3}} + \sqrt{\frac{2}{3}x^2-1}, \quad I = \frac{3}{\sqrt{2}}\left(\frac{1}{8}A^2 - \frac{1}{2}\ln A - \frac{1}{8}\frac{1}{A^2}\right) + C\right)$

7. $\int \frac{dx}{\sqrt{x^2-3x+1}}$ $\qquad \left(\ln\left(\frac{2x-3}{\sqrt{5}} + \sqrt{\left(\frac{2x-3}{\sqrt{5}}\right)^2-1}\right) + C\right)$

8. $\int \sqrt{3-2x-x^2}dx$ $\qquad \left(2\arcsin\frac{x+1}{2} + \sin\left(2\arcsin\frac{x+1}{2}\right) + C\right)$

9. $\int \frac{x^2dx}{\sqrt{x^2+2x+2}}$ $\qquad \left(\frac{x-3}{2}\sqrt{x^2+2x+2} + \frac{1}{2}\ln\left(x+1+\sqrt{x^2+2x+2}\right) + C\right)$

10. $\int \frac{x^6}{\sqrt{1+x^2}}dx$ $\qquad \left(\left(\frac{1}{6}x - \frac{5}{24}x^3 + \frac{5}{16}x\right)\sqrt{1+x^2} - \frac{5}{16}\ln\left(x+\sqrt{x^2+1}\right) + C\right)$