Tööleht nr 6 aines „Matemaatiline analüüs"

I. Leida integraalid vahetu integreerimise teel.

1. $\int 2x^3 dx$

2. $\int x^2 \sqrt{x} dx$

3. $\int (4x^{-5} + x^{-2}) dx$

4. $\int (x + \sqrt{x}) dx$

5. $\int (x+1)(x-1) dx$

6. $\int (x-2)(x+3) dx$

7. $\int \dfrac{1+x^2}{x^5} dx$

8. $\int \dfrac{(x-2)^2}{2x} dx$

9. $\int \dfrac{(1+2x^2) dx}{x^2(1+x^2)}$

10. $\int (2^x - 3^x)^2 dx$

11. $\int \dfrac{\cos 2x dx}{\cos^2 x \sin^2 x}$

12. $\int \tan^2 x dx$

13. $\int \sin \dfrac{\pi}{6} \sin x dx$

14. $\int (\tan x - \cot x)^2 dx$

II. Leida integraalid kasutades ositi integreerimist.

15. $\int \ln x dx$

16. $\int x \ln x dx$

17. $\int x \cos x dx$

18. $\int \arcsin x dx$

19. $\int \arctan x dx$

20. $\int x e^x dx$

III. Leida integraalid kasutades muutujate vahetust (diferentsiaali märgi alla viimist).

21. $\int e^{5x} dx$

22. $\int \dfrac{\ln x}{x} dx$

23. $\int \dfrac{dx}{\cos^2 7x}$

24. $\int \tan 2x dx$

25. $\int \dfrac{\tan \varphi}{\cos^2 \varphi} d\varphi$

26. $\int \dfrac{\sin \varphi}{\cos^3 \varphi} d\varphi$

27. $\int \dfrac{\arctan x}{1+x^2} dx$

28. $\int \dfrac{x^2 dx}{\sqrt[3]{1+x^3}}$

29. $\int \dfrac{(\ln x + 1)^3}{x} dx$

30. $\int \dfrac{dx}{7-8x}$

31. $\int x\sqrt{x^2+1} dx$

32. $\int e^{2x+1} dx$

33. $\int \dfrac{\sin 2x dx}{(1+\cos 2x)^2}$

Vastused.

1. $\dfrac{x^4}{2}+C$

2. $\dfrac{2x^3\sqrt{x}}{7}+C$

3. $-\dfrac{1}{x^4}-\dfrac{1}{x}+C$

4. $\dfrac{x^2}{2}+\dfrac{2x\sqrt{x}}{3}+C$

5. $\dfrac{x^3}{3}-x+C$

6. $\dfrac{x^3}{3}+\dfrac{x^2}{2}-6x+C$

7. $-\dfrac{1}{4x^4}-\dfrac{1}{2x^2}+C$

8. $\dfrac{x^2}{4}-2x+2\ln|x|+C$

9. $-\dfrac{1}{x}+\arctan x+C$

10. $\dfrac{4^x}{\ln 4}-\dfrac{2\cdot 6^x}{\ln 6}+\dfrac{9^x}{\ln 9}+C$

11. $-\cot x-\tan x+C$

12. $\tan x-x+C$

13. $-\dfrac{1}{2}\cos x+C$

14. $\tan x-\cot x-4x+C$

15. $x(\ln x-1)+C$

16. $\dfrac{1}{2}x^2(\ln x-\dfrac{1}{2})+C$

17. $x\sin x+\cos x+C$

18. $x\arcsin x+\sqrt{1-x^2}+C$

19. $x\arctan x-\dfrac{1}{2}\ln(1+x^2)+C$

20. $e^x(x-1)+C$

21. $\dfrac{1}{5}e^{5x}+C$

22. $\dfrac{1}{2}\ln^2 x+C$

23. $\dfrac{\tan 7x}{7}+C$

24. $-\dfrac{1}{2}\ln|\cos 2x|+C$

25. $\dfrac{1}{2}\tan^2\varphi+C$

26. $\dfrac{1}{2\cos^2\varphi}+C$

27. $\dfrac{\arctan^2 x}{2}+C$

28. $\dfrac{1}{2}\sqrt[3]{(1+x^3)^2}+C$

29. $\dfrac{1}{4}(\ln x+1)^4+C$

30. $-\dfrac{1}{8}\ln|7-8x|+C$

31. $\dfrac{1}{3}\sqrt{(x^2+1)^3}+C$

32. $\dfrac{1}{2}e^{2x+1}+C$

33. $\dfrac{1}{2(1+\cos 2x)}+C$