XAMAT, YAMAT

Cvičení 7

Určitý integrál a jeho použití

1. $\int_1^2 2^{3x-3}dx$ $\left\{\frac{7}{3ln2}\right\}$
2. $\int_0^3 \sqrt{9-3x}dx$ $\{6\}$
3. $\int_0^{4\pi} \frac{dx}{sin^2(\frac{\pi+x}{6})}$ $\left\{12\sqrt{3}\right\}$
4. $\int_0^3 2dx$ $\{6\}$
5. $\int_2^4 (x+1)dx$ $\{8\}$
6. $\int_{-1}^1 (2t-1)dt$ $\{-2\}$
7. $\int_{-2}^2 |x|dx$ $\{4\}$
8. $\int_0^4 5x^2dx$ $\left\{\frac{320}{3}\right\}$
9. $\int_0^1 3^x dx$ $\left\{\frac{2}{ln3}\right\}$
10. $\int_2^5 x^3dx$ $\left\{\frac{609}{4}\right\}$
11. $\int_0^2 (1+2x)^6dx$ $\left\{5580\frac{2}{7}\right\}$
12. $\int_{12}^4 \frac{2}{y}dy$ $\{-2\ln 3\}$
13. $\int_0^{2\pi} (2sinx - cosx)dx$ $\{0\}$
14. $\int_0^{\frac{\pi}{4}} \frac{1}{cos^2x}dx$ $\{1\}$
15. $\int_0^1 (4^x + 3x)dx$ $\left\{3(\frac{1}{2}+\frac{1}{ln4}\right\}$
16. $\int_0^{\frac{\pi}{2}} cos^2t \cdot sint\ dt$ $\left\{\frac{1}{3}\right\}$
17. $\int_0^{\frac{\pi}{2}} sin(2x)\ dx$ $\{1\}$
18. $\int_0^1 x \cdot e^x\ dx$ $\{1\}$
19. $\int_{-1}^0 2^x(2x+2)\ dx$ $\left\{\frac{-1+ln4}{ln^22}\right\}$
20. $\int_1^e \frac{1+lnx}{x}\ dx$ $\left\{\frac{3}{2}\right\}$
21. $\int_1^2 \frac{1}{x^2} \cdot e^{\frac{1}{x}}\ dx$ $\left\{e - \sqrt{e}\right\}$
22. $\int_0^{\frac{\pi}{2}} x \cdot cosx\ dx$ $\left\{\frac{\pi}{2} - 1\right\}$
23. $\int_0^{\frac{\pi}{2}} e^{2x} \cdot sinx\ dx$ $\left\{\frac{1}{5}(2e^{\pi}+1)\right\}$

24. $\int_0^1 arctg\ u\ du$ $\left\{\frac{\pi}{4} - ln\sqrt{2}\right\}$

25. $\int_0^1 \frac{arctgx}{1+x^2}\ dx$ $\left\{\frac{\pi^2}{32}\right\}$

26. $\int_1^e ln^2 x dx$ $\{e-2\}$

Vypočítejte obsah rovinného obrazce ohraničeného křivkami:

a) $y = 2 - \frac{1}{3}x^2; x + y = 2$ $\left\{\frac{3}{2}\right\}$

b) $y = 4 - x^2; y = -5$ $\{36\}$

c) $y = 4 - x^2; y = 3x$ $\left\{\frac{125}{6}\right\}$

d) $y = \frac{1}{2}x^2 - 1; x + y = 3$ $\{18\}$

e) $y = \frac{6}{x}; y = 7 - x$ $\left\{\frac{35}{2} - 6\ln\ 6\right\}$

f) $y = x; y = \frac{1}{x}; x = 2$ $\left\{\frac{3}{2} - \ln\ 2\right\}$

g) $y = x^3; y = 4x$ $\{8\}$

h) $y = x^2 + 1; y = 2x^2$ $\left\{\frac{4}{3}\right\}$

i) $y = 3 - x; y = 2\sqrt{x}; y = 0$ $\left\{\frac{10}{3}\right\}$

j) $y = \ln x\,; y = 2; x = e^4$ $\{e^4 + e^2\}$

k) $y = \frac{x^2}{3}; y = 1 + \frac{2}{3}x; y = 0; x = 6$ $\{15\}$

l) $y = 4x - x^2; y = 3x - 6; y = 0;$ pro $x \geq 2$ $\left\{\frac{19}{6}\right\}$

m) $y = x; y = \frac{4}{x}; x = 1; x = 6; y = 0$ $\left\{\frac{3}{2} + 4\ln\ 3\right\}$

n) $y = x + 4; y = x^2 + 2; y = 0; x = 2$ $\left\{\frac{27}{2}\right\}$

o) $y = e^x; y = e^{2-x}; x = 0; x = 3; y = 0$ $\{2e - 1 - e^{-1}\}$