

Applications of definite integrals

Calculate the area of a set of points A, which is bounded by curve segments. Describe the set A and sketch it in the Cartesian coordinate system.

1. Graph of function $y = \sqrt{2x+1}$ and axis x on interval $\langle 0, 4 \rangle$ $\left(P = \frac{26}{3} \right)$
2. Graph of function $y = \ln x$ and axis x on interval $\langle 1, e \rangle$ $(P = 1)$
3. Graphs of functions $y = e^x$, $y = e^{-x}$ on interval $\langle 0, 1 \rangle$ $\left(P = e + \frac{1}{e} - 2 \right)$
4. Graphs of functions $y = \cos x$, $y = x - \frac{\pi}{2}$ on interval $\left\langle -\frac{\pi}{2}, \frac{\pi}{2} \right\rangle$ $\left(P = 2 + \frac{\pi^2}{2} \right)$
5. Graphs of functions $y = 2x - x^2$, $y = x - 2$. $\left(P = \frac{9}{2} \right)$
6. Graphs of functions $y = x^2 - 1$, $y = -\frac{1}{4}x^2 + 4$. $\left(P = \frac{40}{3} \right)$
7. Graphs of functions $y = x^2 - 2x$, $y = 4 - x^2$. $(P = 9)$
8. Graphs of functions $y = x^4$, $y = \sqrt[3]{x}$ $\left(\frac{11}{20} \right)$
9. Graphs of functions $y = \frac{4}{x}$, $y = 5 - x$ $\left(P = \frac{15}{2} - 4 \ln 4 \right)$
10. Graphs of functions $y = x^2$, $y = \sqrt{x}$ $\left(P = \frac{1}{3} \right)$
11. Graphs of functions $y = x^2$, $y = \sqrt{2-x}$ and axis y . $\left(P = \frac{4\sqrt{2}}{3} - 1 \right)$
12. Graphs of functions $y = x^2$, $y = \sqrt{2-x}$ and axis x . $(P = 1)$
13. Graphs of functions $y = x^2$, $y = 2x^2$, $y = 2$ $\left(P = \frac{8(\sqrt{2}-1)}{3} \right)$
14. Parabola $x = y^2 - 1$ and line $y = x - 1$ $\left(P = \frac{9}{2} \right)$

Evaluate volume of a solid generated by revolution of set A about the axis x, while A is bounded by curve segments. Describe A and sketch it in the Cartesian coordinate system.

1. Graph of function $y = \frac{4}{x}$ and axis x on interval $\langle 1, 4 \rangle$. (12π)

2. Graph of function $y = \tan x$ and axis x on interval $\left\langle 0, \frac{\pi}{4} \right\rangle$ $\left(\pi - \frac{\pi^2}{4} \right)$

3. Graph of function $y = \sqrt{2x-3}$ and axis x on interval $\langle 2, 6 \rangle$ (20π)

4. Graphs of functions $y = 1 - x^2$, $y = x^2 + 2$ on interval $\langle -1, 1 \rangle$ (10π)

5. Graphs of functions $y = x^4$, $y = \sqrt[3]{x}$ $\left(\frac{22}{45} \pi \right)$

6. Graphs of functions $y = \sin x$, $y = \frac{2x}{\pi}$ $\left(\frac{\pi^2}{12} \right)$

7. Evaluate volume of truncated cone with radii of the two bases $R = 4$, $r = 2$ and with the altitude $v = 3$. (28π)

8. Evaluate volume of truncated cone with the radii of the two bases R , r and with the altitude výškou v . $\left(\frac{\pi v}{3} (R^2 + Rr + r^2) \right)$