1. Vypočtěte neurčité integrály

$$\int (-\sin x + \frac{1}{2\sqrt{x}})\mathrm{d}x = \qquad \left[cosx + \sqrt{x} + c\right]$$

$$\int \left(3^x + \frac{4}{3\cos^2 x}\right)\mathrm{d}x = \qquad \left[\frac{3^x}{ln3} + \frac{4}{3}tgx + c\right]$$

$$\int \left(\frac{2}{\sin^2 x} - \frac{e^x}{3}\right)\mathrm{d}x = \qquad \left[-2cotgx - \frac{1}{3}e^x + c\right]$$

$$\int \frac{x^3 - x^5 + 1}{3x}\mathrm{d}x = \qquad \left[\frac{1}{9}x^3 - \frac{x^5}{15} + \frac{1}{3}\ln|x| + c\right]$$

$$\int \sqrt{x\sqrt{x}}\,\mathrm{d}x = \qquad \left[\frac{4}{7}\sqrt[4]{x^7} + c\right]$$

$$\int \frac{10^x + 4^x}{2^x}\mathrm{d}x = \qquad \left[\frac{5^x}{ln5} + \frac{2^x}{ln2} + c\right]$$

$$\int \sin(4x - 3)\,\mathrm{d}x = \qquad \left[-\frac{1}{4}\cos(4x - 3) + c\right]$$

$$\int \frac{1}{2x - 1}\mathrm{d}x = \qquad \left[\frac{1}{2}\ln|2x - 1| + c\right]$$

$$\int e^{-3x+1}\mathrm{d}x = \qquad \left[-\frac{1}{3}e^{-3x+1} + c\right]$$

$$\int \sqrt{x} \cdot \ln^2 x\,\mathrm{d}x = \qquad \left[\frac{2}{3}\sqrt{x^3}\left(\ln^2 x - \frac{4}{3}lnx + \frac{8}{9}\right) + c\right]$$

$$\int 3e^x\sqrt{1 + e^x}dx = \qquad \left[2\sqrt{(1 + e^x)^3} + c\right]$$

$$\int \frac{e^{\frac{1}{x}}}{x^2}dx = \qquad \left[-e^{\frac{1}{x}} + c\right]$$

$$\int \frac{(1 + lnx)^{\frac{1}{2}}}{x}dx = \qquad \left[\frac{2}{3}\sqrt{(1 + lnx)^3} + c\right]$$

$$\int \frac{cosx}{\sqrt[3]{\sin^2 x}}dx = \qquad \left[3\sqrt[3]{sinx} + c\right]$$

$$\int \frac{2x^2}{\cos^2(x^3 + 1)}dx = \qquad \left[\frac{2}{3}tg(x^3 + 1) + c\right]$$

$$\int \frac{\sin 2x}{3 + \sin^2 x}dx = \qquad [\ln|3 + \sin^2 x| + c]$$

$$\int \ln x\,dx = \qquad [x(lnx - 1) + c]$$

$$\int \cos^2 x dx = \qquad \left[\frac{1}{2}(x + sinxcosx) + c\right]$$

2. Vypočtěte určité integrály

$$\int_0^{\frac{\pi}{2}} \sin x \cdot \cos x \mathrm{d}x = \qquad \left[\frac{1}{2}\right]$$

$$\int_0^1 \frac{6^x}{2^x} \mathrm{d}x = \qquad \left[\frac{2}{ln3}\right]$$

$$\int_0^{\frac{\pi}{2}} \cos x \, dx = \qquad [1]$$

$$\int_1^3 \frac{1}{1+x} dx = \qquad [\ln 2]$$

$$\int_0^5 \frac{\cos^4 x - \sin^4 x}{\cos 2x} dx = \qquad [5]$$

3. Vypočtěte plošný obsah rovinného obrazce, který je ohraničen danými křivkami

$$y = 2 - x^2, x = y$$

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4. Vypočtěte objem rotačního tělesa, které vznikne rotací oblouku kolem sinusoidy y=sinx kolem osy y v <0;π>

$\left[\frac{1}{2}\pi^2\right]$