Studienberechtigung TU-WIEN

Lösungen von Übungbeispielen :

$$\int \frac{5 + x}{x + x^2}\,dx \to 5\cdot\ln(x) - 4\cdot\ln(1 + x)$$

$$\int \frac{1}{1 - x^2}\,dx \to \operatorname{atanh}(x)$$

$$\int 3^x\,dx \to \frac{1}{\ln(3)}\cdot 3^x$$

$$\int \frac{x^3}{4}\cdot e^{2-x^4}\,dx \to \frac{-1}{16}\cdot\exp\left(2 - x^4\right)$$

$$\int x^3\cdot\cos\left(\frac{2 - x^4}{5}\right)dx \to \frac{5}{4}\cdot\sin\left(\frac{-2}{5} + \frac{1}{5}\cdot x^4\right)$$

$$\int \sin(x)^5\cdot\cos(x)\,dx \to \frac{1}{6}\cdot\sin(x)^6$$

$$\int 5^{4x+9}\,dx \to \frac{1}{\ln(5)\cdot 4}\cdot 5^{(4\cdot x+9)}$$

$$\int \frac{-20 - 25\cdot x + 7\cdot x^2}{-4x + x^2}\,dx \to 7\cdot x + 5\cdot\ln(x) - 2\cdot\ln(-4 + x)$$

$$\int \frac{5 + x}{x + x^2}\,dx \to 5\cdot\ln(x) - 4\cdot\ln(1 + x)$$

$$\int \frac{3}{36 + 24\cdot x + 4\cdot x^2}\,dx \to \frac{-3}{4\cdot(x + 3)}$$

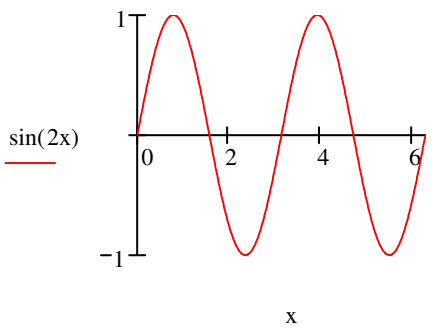
$$\int x^2 \cdot e^x \, dx \rightarrow x^2 \cdot \exp(x) - 2 \cdot x \cdot \exp(x) + 2 \cdot \exp(x)$$

$$\int \sin\left(3x^{2-1}\right) \cdot x \, dx \rightarrow \frac{1}{9} \cdot \sin(3 \cdot x) - \frac{1}{3} \cdot x \cdot \cos(3 \cdot x)$$

$$\int x \cdot \left(\cos(x - \pi) - e^{-x^2+1}\right) dx \rightarrow -\cos(x) - \sin(x) \cdot x + \frac{1}{2} \cdot \exp\left(-x^2 + 1\right)$$

I8e

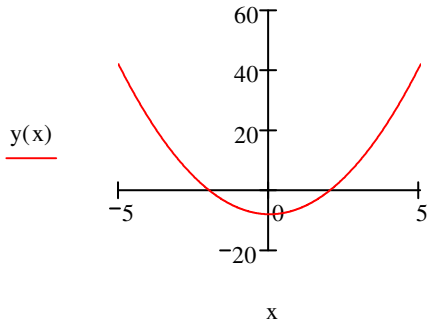
$$\int_0^{2 \cdot \pi} \sin(2x) \, dx \rightarrow 0$$



I10a

$y(x) := 2x^2 - 8$

$x_1 := 2 \qquad x_2 := -2$



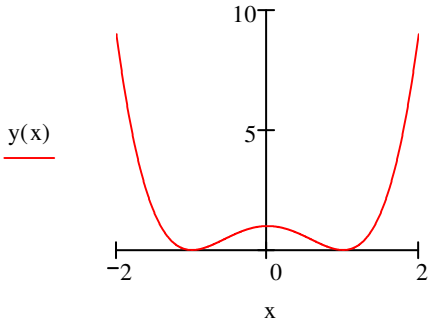
$$\int_{-2}^{2} y(x) \, dx \rightarrow \frac{-64}{3}$$

I10e

$$y(x) := x^4 - 2x^2 + 1$$

$$x^4 - 2x^2 + 1$$

$$\begin{pmatrix} 1 \\ 1 \\ -1 \\ -1 \end{pmatrix}$$

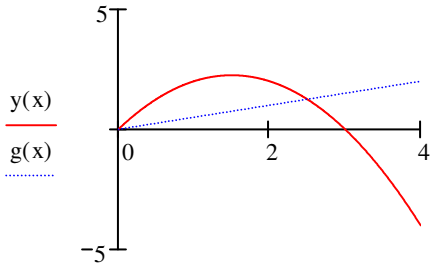


$$\int_{-1}^{1} y(x)\,dx \rightarrow \frac{16}{15}$$

I11a

$$y(x) := 3\cdot x - x^2 \qquad g(x) := \frac{x}{2} \qquad 3\cdot x - x^2 = \frac{x}{2}$$

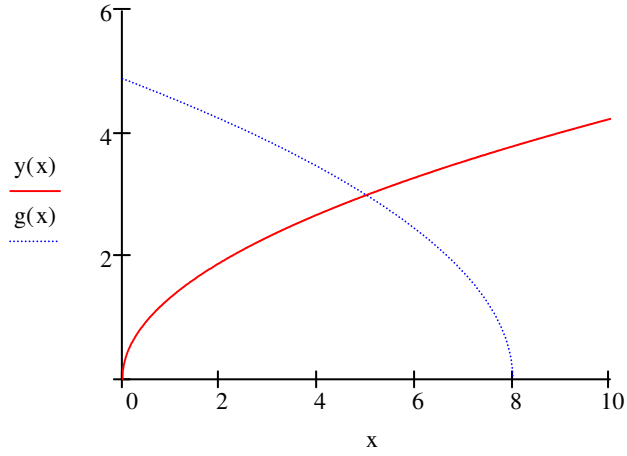
Schnittpunkte : $\begin{pmatrix} 0 \\ \frac{5}{2} \end{pmatrix}$



$$\int_{0}^{\frac{5}{2}} y(x)\,dx - \int_{0}^{\frac{5}{2}} g(x)\,dx \rightarrow \frac{125}{48}$$

I11g $y(x) := \sqrt{\frac{9}{5}\cdot x}$ $g(x) := \sqrt{-3\cdot(x-8)}$ $\sqrt{\frac{9}{5}\cdot x} = \sqrt{-3\cdot(x-8)}$

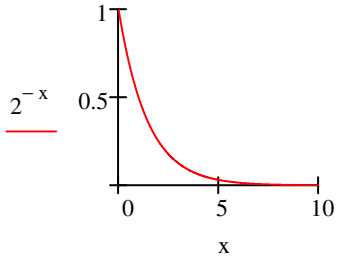
Schnittpunkte : 5



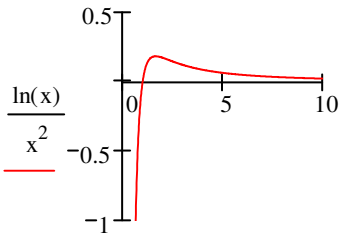
$$\left(\int_0^5 y(x)\,dx\right) + \int_5^8 g(x)\,dx \rightarrow 16$$

I12

$$\int_0^\infty 2^{-x}\,dx \rightarrow \frac{1}{\ln(2)}$$



$$\int_1^\infty \frac{\ln(x)}{x^2}\,dx \rightarrow 1$$



$$\int_1^5 \frac{x}{\sqrt{x^2 - 1}}\,dx \to 2\cdot\sqrt{6}$$