# Funktionen – Integralrechnen mit der Potenzregel

*Lösungsblatt 1*

*Berechnen Sie die unbestimmten Integrale mit Hilfe der Potenzregel!*

$\int 4 \,.\, x \,.\, dx = \frac{4}{2} \,.\, x^2 + c = \mathbf{2 \,.\, x^2 + c}$

$\int \frac{x^3}{x^2} \,.\, dx = \int x \,.\, dx = \frac{1}{2} \,.\, x^2 + c$

$\int \frac{8\,x^3}{x^2} \,.\, dx = \int 8\,x \,.\, dx = \frac{8}{2} \,.\, x^2 + c = \mathbf{4 \,.\, x^2 + c}$

$\int - \frac{x^7}{2x^6} \,.\, dx = \int - \frac{x}{2} \,.\, dx = - \frac{x^2}{2\,.\,2} + c = - \frac{1}{4} \,.\, x^2 + c$

$\int \frac{1}{5x^3} \,.\, dx = \int \frac{x^{-3}}{5} \,.\, dx = \frac{x^{-2}}{5\,.\,(-2)} + c = - \frac{1}{10x^2} + c$

$\int 10 \,.\sqrt[3]{x^2} \,.\, dx = 10 \,.\int x^{\frac{2}{3}} \,.\, dx = (10 \,.\, x^{\frac{5}{3}}) : \frac{5}{3} + c = 6 \,.\, x^{\frac{5}{3}} + c = \mathbf{6 \,.\sqrt[3]{x^5} + c}$

$\int [-(7x^{-4})^2] \,.\, dx = \int -(49x^{-8}) \,.\, dx = \frac{-49x^{-7}}{-7} + c = 7 \,.\, x^{-7} + c = \frac{7}{x^7} + c$

$\int 4 \,.\, x \,.\, dx = \frac{4}{2} \,.\, x^2 + c = \mathbf{2 \,.\, x^2 + c}$

$\int 3.\sqrt{x} \,.\, dx = 3 \,.\int x^{\frac{1}{2}} \,.\, dx = 3 \,.\, \frac{2}{3} \,.\, x^{\frac{3}{2}} + c = 2 \,.\, \sqrt{x^3} + c = \mathbf{2x \,.\, \sqrt{x} + c}$

$\int (x + \sqrt{x}) \,.\, dx = \int (x + x^{\frac{1}{2}}) \,.\, dx = \frac{1}{2} \,.\, x^2 + \frac{2}{3} \,.\, x^{\frac{3}{2}} + c = \frac{x^2}{2} + \frac{2}{3} \,.\, \sqrt{x^3} + c = \frac{x^2}{2} + \frac{2x}{3} \,.\, \sqrt{x} + c$

$\int \frac{7}{x} \,.\, dx = \mathbf{7 \,.\, \ln|x| + c}$

$\int \frac{6}{x-8} \,.\, dx = \mathbf{6 \,.\, \ln|x-8| + c}$

$\int \ln(x^4) \,.\, dx = \int 4 \,.\, \ln x \,.\, dx = \mathbf{4 \,.\, (x \,.\, \ln x - x) + c}$

$\int \frac{\sqrt{x^2-2x+1}}{3\,.\,(x-1)\,.\,\sqrt{x}} \,.\, dx = \frac{1}{3} \,.\int \frac{\sqrt{(x-1)^2}}{(x-1)\,.\,\sqrt{x}} \,.\, dx = \frac{1}{3} \,.\int \frac{(x-1)}{(x-1)\,.\,\sqrt{x}} \,.\, dx = \frac{1}{3} \,.\int \frac{1}{\sqrt{x}} \,.\, dx =$

$= \frac{1}{3} \,.\int x^{-\frac{1}{2}} \,.\, dx = \frac{1}{3} \,.\, \frac{2}{1} \,.\, x^{\frac{1}{2}} + c = \mathbf{\frac{2}{3} \,.\, \sqrt{x} + c}$

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