Lösungen zu den Aufgaben zu Ableitungen 2

negative Potenzen

Bilde die 1. und die 2. Ableitung!

f(x)	f'(x)	f''(x)
$f(x) = \frac{1}{x} = x^{-1}$	$-x^{-2}$ $(=-\frac{1}{x^2})$	$2\,x^{-3}$ $(=\frac{2}{x^3})$
$f(x) = \frac{2}{x^2} = 2x^{-2}$	$-4x^{-3}(=-\frac{4}{x^3})$	$12x^{-4}$ $(=\frac{12}{x^4})$
$f(x) = -6 \cdot \frac{1}{x^2} + \frac{2}{x^4} = -6\,x^{-2} + 2\,x^{-4}$	$12\,x^{-3} - 8\,x^{-5}$	$-36\,x^{-4} + 40\,x^{-6}$
$f(x) = \frac{8}{x^5} - \frac{3}{x^3} = 8\,x^{-5} - 3\,x^{-3}$	$-40x^{-6} + 9\,x^{-4}$	$240\,x^{-7} - 36\,x^{-5}$
$f(x) = -6x - \frac{1}{x^2} = -6x - x^{-2}$	$-6 + 2x^{-3}$	$-6x^{-4}$
$f(x) = 7x^7 - \frac{2}{3x^2} = 7x^7 - \frac{2}{3}x^{-2}$	$49x^6 + \frac{4}{3}x^{-3}$	$294x^5 - 4x^{-4}$
$f(x) = 5x^3 + \frac{5}{8x^0} = 5x^3 + \frac{5}{8}$	$15x^2$	$30x$
$f(x) = 2x^{-7} + 5x^{-2} - 7x^{-1}$	$-14x^{-8} - 10x^{-3} + 7x^{-2}$	$112x^{-9} + 30x^{-4} - 14x^{-3}$
$f(x) = -6x^{-4} + 2x^3 - x^{-2}$	$24x^{-5} + 6x^2 + 2x^{-3}$	$-120x^{-6} + 12x - 6\,x^{-4}$
$f(x) = \frac{2}{9}x^{-3} - \frac{3}{5}x^{-10} + \frac{1}{7}x^{14}$	$-\frac{2}{3}x^{-4} + 6x^{-11} + 2\,x^{13}$	$\frac{8}{3}x^{-5} - 66x^{-12} + 26\,x^{12}$
$f(x) = \frac{1}{6}x^{-4} - \frac{1}{4}x^{-3} + \frac{2}{5}x$	$-\frac{2}{3}x^{-5} + \frac{3}{4}x^{-4} + \frac{2}{5}$	$\frac{10}{3}x^{-6} - 3x^{-5}$
$f(x) = \frac{5}{8}x^{-3} - \frac{2}{5}x^{-1} + 4x^5$	$-\frac{15}{8}x^{-4} + \frac{2}{5}x^{-2} + 20x^4$	$\frac{15}{2}x^{-5} - \frac{4}{5}x^{-3} + 80x^3$