
Cornelsen S. 112, Nr. 21

(%i1) "Funktionsuntersuchung"\$

(%i2) f(x) := (x^4 + 16)/(4*x^2);

(%o2)
$$f(x) := \frac{x^4 + 16}{4x^2}$$

(%i3) "Schnittpunkt mit y-Achse"\$

(%i4) f(0);

expt: undefined: 0 to a negative exponent.

#0: f(x=0)

-- an error. To debug this try: debugmode(true);

(%i5) "Nullstellen"\$

(%i6) solve((x^4 + 16)/(4*x^2) = 0, x);

(%o6) $[x = 2(-1)^{1/4}i, x = -2(-1)^{1/4}i, x = -2(-1)^{1/4}i, x = 2(-1)^{1/4}i]$

(%i7) ev(%numer);

(%o7) $[x = 2.0(-1)^{0.25}i, x = -2.0(-1)^{0.25}i, x = -2.0(-1)^{0.25}i, x = 2.0(-1)^{0.25}i]$

(%i8) "1. Ableitung"\$

(%i9) diff(f(x),x);

(%o9)
$$x - \frac{x^4 + 16}{3 \cdot 2x^2}$$

(%i10) sqfr(%);

(%o10)
$$\frac{x^4 - 16}{2 \cdot 3x^2}$$

(%i11) "Mögliche Extremstellen"\$

(%i12) solve(%th(2) = 0,x);

(%o12) $[x = 2i, x = -2, x = -2i, x = 2]$

(%i13) ev(%numer);

(%o13) $[x = 2i, x = -2, x = -2i, x = 2]$

(%i14) "2. Ableitung"\$

(%i15) diff(f(x),x,2);

(%o15)
$$\frac{3(x^4 + 16)}{2x^4} - 1$$

(%i16) sqfr(%);

(%o16)
$$\frac{x^4 + 48}{2x^4}$$

