Ableiten für Fortgeschrittene

Lösungen

Es wird bei den angegebenen Lösungen darauf verzichtet, die Nenner wurzelfrei zu machen.

1

a) $y' = \dfrac{8x}{3\cdot\sqrt[3]{(4x^2-1)^2}}$ b) $y' = \dfrac{4}{3\cdot\sqrt[3]{2x+1}}$ c) $y' = \dfrac{3\cdot(25x^2-4)}{5\cdot\sqrt[5]{(25x^3-12x)^4}}$

d) $y' = \dfrac{18x^5-8x+3}{6\cdot\sqrt[6]{(3x^6-4x^2+3x)^5}}$ e) $y' = \dfrac{3\cdot(6x^2+5)}{4\cdot\sqrt[4]{2x^3+5x}}$ f) $y' = \dfrac{2\cdot(63x^6+2)}{5\cdot\sqrt[5]{(9x^7+2x-1)^3}}$

2

a) $y' = \dfrac{1}{3\cdot\sqrt[3]{(x+7)^2}}\cdot(4x^3-6)+\sqrt[3]{x+7}\cdot 12x^2$

b) $y' = \dfrac{3}{2\cdot\sqrt{3x+x}}\cdot\sqrt[4]{5x^3-8x^2}+\sqrt{3x+x}\cdot\dfrac{x\cdot(15x-16)}{4\cdot\sqrt[4]{(5x^3-8x^2)^3}}$

c) $y' = \dfrac{2\cdot(x+1)}{3\cdot\sqrt[3]{(x^2+2x-1)^2}}\cdot(2x+1)^2+4\cdot\sqrt[3]{x^2+2x-1}\cdot(2x+1)$

d) $y' = \dfrac{3x^2}{5\cdot\sqrt[5]{(x^3+1)^4}}\cdot\sqrt[2]{3x+2}+\sqrt[5]{x^3+1}\cdot\dfrac{3}{2\cdot\sqrt[2]{3x+2}}$

e) $y' = \dfrac{3x^2-8x+5}{4\cdot\sqrt[4]{(x^3-4x^2+5x)^3}}\cdot\sqrt{9x^2+1}+\sqrt[4]{x^3-4x^2+5x}\cdot\dfrac{9x}{\sqrt{9x^2+1}}$

f) $y' = \dfrac{x\cdot(3x+2)}{4\cdot\sqrt[4]{(x^3+x^2-2)^3}}\cdot(x-1)^3+3\cdot\sqrt[4]{x^3+x^2-2}\cdot(x-1)^2$

3

a) $y' = \dfrac{1}{2\cdot(x+2)\cdot\sqrt{x-1}}-\dfrac{\sqrt{x-1}}{(x+2)^2}$

b) $y' = \dfrac{2\cdot\sqrt{4-x^2}}{2-x}+\dfrac{x\cdot(2+x)}{(2-x)\cdot\sqrt{4-x^2}}$

c) $y' = \dfrac{x-2}{(x-1)\cdot\sqrt{x^2-4x+1}}-\dfrac{\sqrt{x^2-4x+1}}{(x-1)^2}$

d) $y' = \dfrac{2\cdot\sqrt{25-x^2}}{5-x}+\dfrac{x\cdot(x+5)}{(5-x)\cdot\sqrt{25-x^2}}$

e) $y' = \dfrac{2}{(x^3-2)^4}-\dfrac{24x^3}{(x^3-2)^5}$

f) $y' = \dfrac{1}{(3x+2)^2\cdot\sqrt{2x-9}}-\dfrac{6\cdot\sqrt{2x-9}}{(3x+2)^3}$

g) $y' = \dfrac{9x^2+2}{2\cdot\sqrt{3x^3+2x}\cdot\sqrt[3]{(12x^5-8x)^2}}-\dfrac{\sqrt{3x^3+2x}\cdot(15x^4-2)}{3x\cdot(3x^4-2)\cdot\sqrt[3]{12x^5-8x}}$

h) $y' = \dfrac{(20x+7)\cdot\sqrt{x^2-3}}{2\cdot(x^2-3)\cdot\sqrt{10x^2+7x}}-\dfrac{x\cdot\sqrt{10x^2+7x}}{(x^2-3)\cdot\sqrt{x^2-3}}$

i) $y' = \dfrac{8}{x\cdot(x+2)\cdot\sqrt{8x^2-5}}-\dfrac{\sqrt{8x^2-5}\cdot(3x+4)}{2x^2\cdot(x+2)\cdot\sqrt{x+2}}$