<u>Lösungen</u> „Ableiten bis der Arzt kommt" ohne Garantie ;-)

a) $f'(x) = 2x - 20x^4$

b) $f'(x) = \frac{1}{2\sqrt{x}} - 1$

c) $f'(x) = \cos(x)\sqrt{x} + \frac{\sin(x)}{2\sqrt{x}}$

d) $f'(x) = -\frac{1}{x^2} + 2x$

$f'(x) = -\frac{1}{x^2}\cos(x) - \frac{1}{x}\sin(x)$

e) $f'(x) = \cos^2(x) - \sin^2(x)$

f) $f'(x) = 2\sin(x)\cos(x)$

g) $f'(x) = 16x^3 - 36x^2 + 18x$

h) $f'(x) = 5(3x^3 - 2x^2)^4(9x^2 - 4x)$

i) $f'(x) = -3(\cos(x))^2 \cdot \sin(x)$

j) $f'(x) = -\frac{5}{2}x^{-\frac{3}{2}} = -\frac{5}{2\sqrt{x^3}}$

k) $f'(x) = -\frac{2}{x^3} + \frac{20}{x^5}$

l) $f'(x) = \frac{\frac{1}{2\sqrt{x}}(\sqrt{x}+3) - \frac{1}{2\sqrt{x}}(\sqrt{x}-3)}{(\sqrt{x}+3)^2} = \frac{\frac{6}{2\sqrt{x}}}{x + 6\sqrt{x} + 9}$

m) $f'(x) = \frac{2x - \cos(x) - x\cdot\cos(x) - x\cdot\sin(x) - \sin(x)}{(\cos(x) - x)^2}$

n) $f'(x) = \frac{\cos^2(x) + \sin^2(x)}{\cos^2(x)}$

o) $f'(x) = -\frac{1}{2\sqrt{\frac{1}{x}}\cdot x^2}$

p) $f'(x) = \frac{x}{\sqrt{x^2 - 1}}$

q) $f'(x) = \frac{1}{2\sqrt{x + \sqrt{x}}}\cdot(1 + \frac{1}{2\sqrt{x}})$

r) $f'(x) = 3(\frac{x+2}{x})^2\cdot(-\frac{2}{x^2})$

s) $f'(x) = \cos(\frac{1}{x})\cdot(-\frac{1}{x^2})$

t) $f'(x) = \sqrt{x^3 + 1} + \frac{3x^3}{2\sqrt{x^3 + 1}}$

u) $f'(x) = 4$

v) $f'(x) = -12\cdot(\cos(4x))^2\cdot(\sin(4x))$

w) $f'(x) = 6x + 12$

x) $f_t'(x) = \frac{tx + 1 - 2t^2}{(tx + 1)^3}$

y) $f_t'(x) = t^3 + 2t^2x + 3tx^2$

z) $f_t'(x) = 0$