APS 04 - Coletânea de exercícios referente ao tópico: Derivadas de Funções Reais de uma Variável Real, elaborada pelos professores: Dr[a]. Dayse Batistus, Msc. Ana Munaretto, Msc. Cristiane Pendeza e Msc. Adriano Delfino.
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1) Calcule a derivada das funções dadas usando a definição

(a) $f(x) = x^2 - 2x$
(b) $f(x) = -3x + 67$
(c) $f(x) = \frac{1}{2}x$
(d) $f(x) = 10^{100^{1000}}$

2) Calcule a derivada das funções abaixo usando as propriedades adequadas

a) $f(x) = 16x^3 - 4x^2 + 3$
b) $f(x) = -5x^3 + 21x^2 - 3x + 4$
c) $f(x) = 5$
d) $y = 7x^4 - 2x^3 + 8x + 2$
e) $f(t) = 2t - 1$
f) $y = 8$
g) $f(x) = x^6$
h) $y = 2x + 1$
i) $f(t) = -2t^2 + 3t - 6$
j) $g(x) = x^2 + 4x^3$
k) $f(x) = x^3 - 3x^2 + 4x^2$
l) $y = \sqrt[5]{x^2} - \sqrt[4]{x^3} + x^4$
m) $y = x^{\frac{4}{5}} - x^{\frac{1}{6}}$
n) $f(x) = 10^{100^{1000}}$

3) Calcule a derivada das funções abaixo usando a regra do quociente e do produto, se necessário

a) $s(t) = \frac{5t-1}{2t-7}$
b) $g(t) = \frac{3t-2}{5t+1}$
c) $f(x) = \frac{3}{x} + 2\sqrt{x} - \frac{1}{4\sqrt{x}}$
d) $f(r) = \frac{4}{r^2} + \frac{5}{r^3}$
e) $f(x) = (2x^2 - 1).(1 - 2x)$
f) $y = (x^2 - 3x^4).(x^5 - 1)$
g) $f(x) = \frac{3x+4}{2x-1}$
h) $g(x) = \frac{5t-2}{1+t+t^2}$
i) $f(x) = (x^2 + 3x + 3).(x + 3)$
j) $f(x) = \frac{2x^3}{4x+2}$
k) $y = \frac{x^2-3x+2}{x^2-x+2}$
l) $y = (x + 2)(x^5 - 6x)$
m) $f(x) = \frac{1}{x^7}$
n) $g(x) = \frac{x^2 - 4}{x+0.5}$
o) $r = 2(\frac{1}{\sqrt{\theta}} + \sqrt{\theta})$
p) $f(x) = \frac{1}{(x^2 - 1)(x^2 + x + 1)}$
q) $v = (1 - t)(1 + t^2)^{-1}$
r) $y = \sqrt{x} + \frac{1}{\sqrt[3]{x^4}}$

4) Calcule a derivada das funções trigonométricas abaixo usando as regras de derivação

a) $f(x) = \tan x = \frac{\sin x}{\cos x}$
b) $g(t) = \sec t = \frac{1}{\cos t}$
c) $g(t) = \sec t = \frac{1}{\cos t}$
d) $f(x) = \sqrt{x}.(2\sin x + x^2)$
e) $h(\theta) = \frac{\pi}{2}\, sen\, \theta - cos\theta$
f) $y = x^3 - \frac{1}{2}\cos x$
g) $y = \frac{5}{(2x)^3} + 2senx$
h) $y = \frac{3}{x} + 5sen(x)$
i) $y = \frac{cotg\,(x)}{1+cotg\,(x)}$

5) **Calcule a derivada das funções exponenciais e logarítmicas abaixo usando as regras de derivação**

a) $f(x) = \frac{e^x}{\cos x}$
b) $y = e^x . \sin x$
c) $f(x) = x^2 . \ln x$
d) $f(x) = (x^2 + 1). e^x$
e) $y = \frac{e^x}{2e^x+1}$
f) $y = xe^x - e^x$
g) $y = x^2e^x - xe^x$
h) $y = 2e^x$
i) $y = e^{-t}(t^2 - 2t + 2)$

6)Usando a definição (de derivadas) $f'(x) = \lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$ ou $f'(p) \frac{f(x) - f(p)}{x - p}$**, calcule a derivada das seguintes funções nos pontos dados:**

a) $f(x) = 2x^2 - 3x + 4 \, ; Po = (2,6)$
b) $f(x) = \frac{3}{x^2} ; Po = (1,3)$
c) $f(t) = \sqrt[3]{t} ; Po = (8,2)$
d) $g(x) = \cos x \, ; Po = (\frac{\pi}{2}, 0)$
e) $f(x) = 3 \sin x \, ; Po = (2\pi, 0)$
f) $v = \frac{3}{\sqrt{t}} - 2\sqrt{t} ; t = 4$
g) $f(x) = 5x - x^2, \, f'(-3), \, f'(0)$
h) $f(x) = x + \frac{9}{x}, x = -3$

7) Usando a regra do quociente e do produto, ache $\frac{dy}{dx}$ no ponto $x = 1$.

a) $y = \frac{2x-1}{x+3}$
b) $y = \frac{4x+1}{x^2 - 5}$
c) $y = \left(\frac{3x+2}{x}\right) . (x^{-5} + 1)$
d) $y = (2x^8 - x^{678}). (\frac{x+1}{x-1})$

8) Resolva e determine se é verdadeiro ou falso, se $g(x) = x^5$, então $\lim_{x\to 2} \frac{g(x) - g(2)}{x-2} = 80$.

9) Resolva e determine se é verdadeiro ou falso:

a) $\frac{d}{dx}(10^x) = x10^{x-1}$
b) $\frac{d}{dx}(\ln 10) = \frac{1}{10}$
c) $\frac{d}{dx}(tan^2 x) = \frac{d}{dx}(sec^2 x)$
d) $\frac{d}{dx}|x^2 + x| = |2x + 1|$

10) Derive utilizando a regra da cadeia

a) $y = sin\, 4x$
b) $y = cos\, 5x$
c) $y = e^{3x}$
d) $f(x) = cos\, 8x$
e) $y = sin\, t^3$
f) $g(t) = ln\,(2t + 1)$
g) $x = e^{sint}$
h) $f(x) = \cos(e^x)$

i) $y = (\sin x + \cos x)^3$
j) $y = \sqrt{(3x+1)}$
k) $y = \sqrt[3]{\left(\frac{x-1}{x+1}\right)}$
l) $y = e^{-5x}$
m) $x = \ln(t^2 + 3t + 9)$
n) $f(x) = e^{\tan x}$
o) $y = \sin(\cos x)$
p) $g(t) = (t^2 + 3)^4$
q) $f(x) = \cos(x^2 + 3)$
r) $y = \sqrt{(x + e^x)}$
s) $y = \tan 3x$
t) $y = \sec 3x$
u) $y = x.e^{3x}$
v) $y = e^x.\cos 2x$
w) $y = e^{-x}.\sin x$
x) $y = e^{-2t}.\sin 3t$
y) $f(x) = e^{-x^2} + \ln(2x+1)$
z) $g(t) = \frac{e^t - e^{-t}}{e^t + e^{-t}}$
aa) $y = \frac{\cos 5x}{\sin 2x}$
bb) $f(x) = \left(e^{-x} + e^{x^2}\right)^3$
cc) $y = t^3.e^{-3t}$
dd) $y = (\sin 3x + \cos 2x)^3$
ee) $y = \sqrt{x^2 + e^{-x}}$
ff) $y = x.\ln(2x + 1)$
gg) $y = [\ln(x^2 + 1)]^3$
hh) $y = \ln(\sec x + tg\, x)$
ii) $f(x) = \ln(x^2 + 8x + 1)$
jj) $f(x) = \sqrt{6x+2}$
kk) $f(x) = x^4.e^{3x}$
ll) $f(x) = \sin^4 x$
mm) $f(x) = 5\tan 2x$
nn) $f(x) = \left(2x^3 - 3x\right).\left(5 - x^2\right)^3$
oo) $f(x) = -\frac{3}{\sqrt{3x-5}}$
pp) $y = e^{x^2+x+1}$
qq) $y = \sin 2x \,.\cos x$
rr) $y = (2x^2 - 4x + 1)^8$
ss) $q = \sqrt{2r - r^2}$
tt) $s = sen\left(\frac{3\pi t}{2}\right) + \cos(\frac{3\pi t}{2})$
uu) $h(x) = x\tan\left(2\sqrt{x}\right) + 7$
vv) $r = \sin(\theta^2)\cos(2\theta)$
ww) $y = (4x+3)^4(x+1)^{-3}$
xx) $y = e^{-3x/2}$
yy) $y = e^{\sqrt{x}}$
zz) $y = x^{\pi}$
aaa) $y = \frac{e^x}{e^{-x} + 1}$
bbb) $y = (x^4 - 3x^2 + 5)^3$
ccc) $y = \cos(\tan x)$
ddd) $y = \frac{3x-2}{\sqrt{2x+1}}$
eee) $y = 2x\sqrt{x^2 + 1}$
fff) $y = \frac{e^x}{1 + x^2}$
ggg) $y = e^{\sin 2\theta}$
hhh) $y = e^{mx}\cos nx$
iii) $y = \sqrt{x}\cos\sqrt{x}$
jjj) $y = \frac{e^{1/x}}{x^2}$
kkk) $y = \frac{1}{\sin(x - \sin(x))}$
lll) $y = \ln(\,cossec\, 5x)$
mmm) $y = \frac{\sec 2\theta}{1 + tg 2\theta}$
nnn) $y = e^{cx}(\,c\sin x - \cos x)$
ooo) $y = \ln(x^2 e^x)$
ppp) $y = \sec(1 + x^2)$
qqq) $y = (1 - x^{-1})^{-1}$
rrr) $y = \frac{1}{\sqrt[3]{(x + \sqrt{x})}}$
sss) $y = \sqrt{\sin\sqrt{x}}$
ttt) $y = \ln(\sin x) - \frac{1}{2}\sin^2 x$
uuu) $y = \frac{\left(x^2+1\right)^4}{(2x+1)^3(3x-1)^5}$
vvv) $y = x tg^{-1}(4x)$
www) $y = e^{\cos x} + \cos(e^x)$
xxx) $y = \ln|\sec 5x + tg\, 5x|$
yyy) $y = cotg\,(3x^2 + 5)$
zzz) $y = \sqrt{t.\ln(t^4)}$
aaaa) $y = \sin(\,tg\sqrt{1 + x^3})$
bbbb) $y = tg^2(\sin\theta)$
cccc) $y = \frac{\sqrt{x+1}\,(2-x)^5}{(x+3)^7}$
dddd) $y = \frac{(x+\lambda)^4}{x^4 + \lambda^4}$
eeee) $y = \frac{\sin mx}{x}$
ffff) $y = \ln\left|\frac{x^2 - 4}{2x+5}\right|$
gggg) $y = \cos(e^{\sqrt{tg\, 3x}})$
hhhh) $y = \sin^2(\cos\sqrt{\sin \pi x})$

11) Dados $\boldsymbol{y = f(u)}$ e $\boldsymbol{u = g(x)}$, determine $\boldsymbol{\frac{dy}{dx} = f'\big(g(x)\big)g'(x)}$.

a)$y = 6u - 9,\ u = \left(\frac{1}{2}\right)x^4$

b) $y = sin\,(u),\ u = 3x + 1$

12) Encontre as funções na forma $\boldsymbol{y = f(u)}$ e $\boldsymbol{u = g(x)}$. Em seguida, determine $\boldsymbol{\frac{dy}{dx}}$ em função de x

a) $y = (4 - 3x)^9$

b) $y = \sec\,(tg\,(x))$

13) Derive utilizando a derivada implícita

a) $xy^4 + x^2y = x + 3y$

b) $x^2 \cos y + sin\,2y = xy$

c) $sin\,(xy) = x^2 - y$

d) $y = xe^y - y - 1$

14) Encontre a derivada das seguintes funções:

a) $y = 8^x$

b) $y = 3^{cossec(x)}$

c) $y = x^{(x^2+1)}$

d) $y = 7^{x^2+2x}$

e) $y = 3^{x \ln x}$

f) $y = \log_5(1 + 2x)$

g) $y = (\cos x)^x$

h) $y = xsinh\,x^2$

i) $y = \ln(\cosh 3x)$

j) $y = cosh^{-1}\,(sinh\,x)$

k) $y = 10^{tg\,\pi\theta}$

l) $y = x.tgh^{-1}\sqrt{x}$

15) Derive utilizando a derivada inversa

a) $y = (\,arcsin\,2x)^2$

b) $y = arctg\,(\,arcsin\sqrt{x})$

Respostas

1)

a)) $f'(x) = 2(x-1)$ b) $f'(x) = \frac{1}{2}$ c) $f'(x) = -3$

2)

a) $f'(x) = 48x^2 - 8x$
b) $f'(x) = -15x^2 + 42x - 3$
c) $f'(x) = 0$
d) $y' = 28x^3 - 6x^2 + 8$
e) $f'(t) = 2$
f) $y' = 0$
g) $f'(x) = 6x^5$
h) $y' = 2$
i) $f'(t) = -4t + 3$
j) $g'(x) = 12x^2 + 2x$
k) $f'(x) = 3x^2 + 2x$
l) $y' = \frac{2}{5\sqrt[5]{x^3}} - \frac{3}{4\sqrt[4]{x}} + 4x^3$
m) $f'(x) = \frac{4}{5\sqrt[5]{x}} - \frac{1}{6\sqrt[6]{x^5}}$
n) a) $f'(x) = 0$

3)

a) $s'(t) = \frac{-33}{(2t^2-7)^2}$
b) $g'(t) = \frac{13}{(5t+1)^2}$
c) $f'(x) = -\frac{3}{x^2} + \frac{1}{\sqrt{x}} + \frac{1}{8x\sqrt{x}}$
d) $f'(r) = \frac{-8r-15}{r^4}$
e) $f'(x) = -6x^2 + 2x + 1$
f) $y' = x(-27x^7 + 7x^5 + 12x^2 - 2)$
g) $f'(x) = \frac{-11}{(2x-1)^2}$
h) $g'(t) = \frac{7-5t^2+4t}{(1+t+t)^2}$
i) $f'(x) = x^2 + 4x + 4$
j) $f'(x) = \frac{x^2(4x+3)}{(2x+1)^2}$
k) $y' = \frac{2(x^2-2)}{(x^2-x+2)^2}$
l) $y' = 3x^5 + 5x^4 - 6x - 6$
m) $y' = -\frac{7}{x^8}$
n) $g'(x) = \frac{x^2+x+4}{(x+0.5)^2}$
o) $r' = \frac{1}{\sqrt{\theta}} - \frac{1}{\theta\sqrt{\theta}}$
p) $f(x) = \frac{-4x^3-3x^2+1}{\left((x^2-1)(x^2+x+1)\right)^2}$
q) $v' = \frac{t^2-2t-1}{(1+t^2)^2}$
r) $y' = \frac{1}{2\sqrt{x}} - \frac{4}{3x^2\sqrt[3]{x}}$

4)

a) $f'(x) = \sec^2 x$
b) $g'(t) = \tan t + \sec t$
c) $h'(t) = -cossec^2\, t$
d)$f'(x) = \frac{2\sin x + x^2}{2\sqrt{x}} + 2(\sqrt{x}\cos x + x)$
e)h'(θ) $= \frac{\pi}{2}\cos\theta + \sin\theta$
f) $y' = 3x^2 + \frac{1}{2}\sin x$
g) $y' = -\frac{15}{8x^4} + 2\cos x$
h) $y' = 5\cos x - \frac{3}{x^2}$
i) $y' = -\frac{1}{2.\sin x.\cos x + 1}$

5)

a) $f'(x) = \frac{e^x(\sin x + \cos x)}{\cos^2 x}$
b) $f'(x) = e^x(\sin x + \cos x)$
c) $f'(x) = x(2\ln x + 1)$
d) $f'(x) = e^x(x^2 + 2x + 1)$
e) $y' = \frac{e^x}{(2e^x+1)^2}$
f) $y' = e^x.x$
g) $y' = e^x(x^2 + x - 1)$
h) $y' = 2e^x$
i) $y' = \frac{(-t^2+4t-4)}{e^t}$

6)

a) $f'(2) = 5$
b) $f'(1) = -6$

c) $f'(8) = \frac{1}{12}$

d) $g'\left(\frac{\pi}{2}\right) = -1$

e) $f'(2\pi) = 3$

f) $v(4) = -\frac{11}{16}$

g) $f'(-3) = 11$ e $f'(0) = 5$

h) $f'(-3) = 0$

7)

a) $y'(1) = \frac{7}{6}$

b) $y'(1) = -\frac{13}{8}$

c) $y'(1) = -29$

d) $Descontínua\ em\ x = 1$

8)

Verdadeira

9)

a) Falsa b) Falsa c) Verdadeira d)Falsa (Verificar)

10)

a) $y' = 4.\cos 4x$

b) $y' = -5.sin\ 5x$

c) $y' = 3.e^{3x}$

d) $f'(x) = -8.\sin 8x$

e) $y' = 3t^2 \cos t^3$

f) $g'(t) = \frac{2}{2t+1}$

g) $x' = e^{sint} \cos t$

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

i) $y' = 3(\sin x + \cos x)^2(\cos x - \sin x)$

j) $y' = \frac{3}{2\sqrt{3x+1}}$

k) $y' = \frac{2}{3(x+1)^2}.\sqrt[3]{\left(\frac{x+1}{x-1}\right)^2}$

l) $y' = -5e^{-5x}$

m) $x' = \frac{2t+3}{t^2+3t+9}$

n) $f'(x) = e^{\tan x}.\sec^2 x$

o) $y' = -\sin x \cos(\cos x)$

p) $g'(t) = 8t(t^2+3)^3$

q) $f'(x) = -2x.\sin(x^2+3)$

r) $y' = \frac{1+e^x}{2\sqrt{x+e^x}}$

s) $y' = 3\sec^2 3x$

t) $y' = 3\sec 3x \tan 3x$

u) $y' = e^{3x}(1+3x)$

v) $y' = e^x(\cos 2x - 2.\sin 2x)$

w) $y' = e^{-x}(\cos x - \sin x)$

x) $y' = e^{-2t}(3\cos 3t - 2\sin 3t)$

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

z) $g'(t) = \frac{4.e^{2t}}{(e^{2t}+1)^2}$

aa) $y' = \frac{-5\sin 5x\ sin2x - 2\cos 5x \cos 2x}{\sin^2 2x}$

bb) $f'(x) = 3\left(e^{-x} + e^{x^2}\right)^2\left(-e^{-x} + 2xe^{x^2}\right)$

cc) $y' = 3t^2e^{-3t}(1-t)$

dd) $y' = 3(\sin 3x + \cos 2x)^2.(3\cos 3x - 2\sin 2x)$

ee) $y' = \frac{2x - e^{-x}}{2\sqrt{x^2+e^{-x}}}$

ff) $y' = \ln(2x+1) + \frac{2x}{(2x+1)}$

gg) $y' = \frac{6x[\ln(x^2+1)]^2}{x^2+1}$

hh) $y' = \sec x$

ii) $y' = \frac{2x+8}{x^2+8x+1}$

jj) $f'(x) = \frac{3}{\sqrt{6x+2}}$

kk) $f'(x) = e^{3x}x^3(4+3x)$

ll) $f'(x) = 4\sin^3 x cos\ x$

mm) $f'(x) = 10\sec^2 2x$

nn) $f'(x) = (5-x^2)^2.[(6x^2-3).(5-x^2) - 6x.(2x^3-3x)]$

oo) $f'(x) = \frac{9}{2.\sqrt{(3x-5)^3}}$

pp) $y' = e^{x^2+x+1}.(2x+1)$

qq) $y' = 2.\cos 2x.\cos x - \sin 2x.\sin x$

rr) $y' = 32(2x^2-4x+1)^7(x-1)$

ss) $q' = \frac{1-r}{\sqrt{2r-r^2}}$

tt) $s' = \frac{3\pi}{2}\cos\left(\frac{3\pi x}{2}\right) - \frac{3\pi}{2}\sin\left(\frac{3\pi x}{2}\right)$

uu) $h'(x) = \tan(2\sqrt{x}) + \sqrt{x}.sec^2(2\sqrt{x})$

vv) $r' = 2\theta.\cos\theta^2 \cos 2\theta - 2.\sin\theta^2 \sin 2\theta$

ww) $y' = \frac{(4x+3)^3(4x+7)}{(x+1)^4}$

xx) $y' = -\frac{3}{2.\sqrt{e^{3x}}}$

yy) $y' = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$

zz) $y' = \frac{x^\pi \pi}{x}$

aaa) $y' = \frac{(2.e^{2x}+e^{3x})}{(e^x+1)^2}$

bbb) $y' = 6x.(x^4-3x^2+5)^2.(2x^2-3)$

ccc) $y' = -\sin(\tan x)\sec^2 x$

ddd) $y' = \frac{3x+5}{\sqrt{2x+1}.(2x+1)}$

eee) $y' = \frac{2.(2x^2+1)}{\sqrt{x^2+1}}$

fff) $y' = \frac{e^x(1+x^2-2x)}{(1+x^2)^2}$

ggg) $y' = 2.e^{sin2\theta}\cos 2\theta$

hhh) $y' = e^{mx}(m\cos nx - n\sin nx)$

iii) $y' = \frac{1}{2\sqrt{x}}(\cos\sqrt{x} - \sqrt{x}.\sin\sqrt{x})$

jjj) $y' = -\frac{e^{\frac{1}{x}}(1+2x)}{x^4}$

kkk) $y' = \frac{\cos x - \cos(x - \sin x)}{\sin(x - sinx)^2}$

lll) $y' = -5\,cotg\,5x$
mmm) $y' = \frac{2\sec 2\theta(\tan 2\theta - 1)}{(1+\tan 2\theta)^2}$
nnn) $y' = e^{cx}.(c^2.\sin x + \sin x)$
ooo) $y' = \frac{2+x}{x}$
ppp) $y' = 2x.sec(1+x^2).\tan(1+x^2)$
qqq) $y' = -\frac{1}{(x-1)^2}$
rrr) $y' = -\frac{1}{6}.\frac{2\sqrt{x}+1}{\sqrt{x}.\sqrt[3]{(x+\sqrt{x})^4}}$
sss) $y' = \frac{\cos\sqrt{x}}{4\sqrt{x\sin\sqrt{x}}}$
ttt) $y' = (cotgx - \sin x\cos x) = \frac{\cos^3 x}{\sin x}$
uuu) $y' = -\frac{(x^2+1)^3.(x^2+56x+9)}{(2x+1)^4.(3x-1)^6}$
vvv) $y' = cotg\,4x - 4x.cossec\,4x$
www) $y' = e^x\sin e^x - e^{cosx}\sin x$
xxx) y' = 5sec 5x
yyy) $y' = -6x.cossec^2(3x+5)$
zzzz) $y' = \frac{(\ln(t^4)+4)}{2\sqrt{t.ln(t^4)}}$
aaaa) $y' = \frac{3x^2.\cos(tan\sqrt{1+x^3}).\sec^2\sqrt{1+x^3}}{2\sqrt{1+x^3}}$
bbbb) $y' = 2\tan(sin\theta).\sec^2(\sin\theta).cos\theta$
cccc) $y' = \frac{1(2-x)^5}{2\sqrt{x+1}(x+3)^7} - \frac{5\sqrt{x+1}(2-x)^4}{(x+3)^7} - \frac{7\sqrt{x+1}(2-x)^5}{(x+3)^8}$
dddd) $y' = \frac{4(x+\lambda)^3(x^4+\lambda^4)-(x+\lambda)^4.4x^3}{(x^4+\lambda^4)^2}$
eeee) $y' = \frac{mx.\cos mx - \sin(mx)}{x^2}$
ffff) $y' = \frac{2x}{(x^2-4)} - \frac{2}{(2x+5)}$
gggg) $y' = -\frac{3}{2\tan\sqrt{3x}}.\sin(e^{\sqrt{\tan 3x}}).e^{\sqrt{\tan 3x}}.\sec^2 3x$
hhhh)
$y' = \frac{-\pi.\sin(\cos(\sqrt{\sin\pi.x})).\sin(\sqrt{\sin\pi x}).\cos(\cos\sqrt{sin\pi x}).\cos\pi x}{\sqrt{\sin\pi x}}$

11)

a) $\frac{dy}{dx} = 12x^3$

b) $\frac{dy}{dx} = 3\cos(3x+1)$

12)

a) $\frac{dy}{dx} = -27(4-3x)^8$

b) $\frac{dy}{dx} = \sec(\tan(x)).\tan(\tan(x)).\sec^2 x$

13)

a) $y' = \frac{1-y^4-2xy}{4xy^3+x^2-3}$

b) $y' = \frac{y-2xcosy}{2\cos 2y - x^2\sin y - x}$

c) $y' = \frac{(2x - y.\cos xy)}{x.\cos xy + 1}$

d) $y' = \frac{e^y}{2-x.e^y}$

14)

a) $y' = 8^x.\ln(8)$

b) $y' = -3^{cossecx}.\ln(3)\,cossecx.cotgx$

c) $y' = (x^2+1).x^{x^2} + x^{x^2+1}.lnx.2x$

d) $y' = 7^{x^2+2x}\ln 7.(2x+2)$

e) $y' = 3^{x.lnx}\ln 3(\ln x + 1)$

f) $y' = \frac{2}{(1+2x)\ln 5}$

g) $y' = \cos(x)^x(\ln(\cos(x)) - x.\tan x)$

h) $y' = \sinh(x^2) + 2x^2\cosh(x^2)$

i) $y' = \frac{3\sinh 3x}{\cosh 3x}$

j) $y' = -\frac{\sinh(\sinh(x)).\cosh x}{\cosh(\sinh(x))^2}$

k) $y' = \pi.10^{\tan\pi x}.\sec^2\pi x.\ln(10)$

l) $y' = \frac{2\tanh\sqrt{x} - \sqrt{x}sech^2\sqrt{x}}{2\tanh^2\sqrt{x}}$

15)

a) $y' = \frac{4arcsin(2x)}{\sqrt{1-4x^2}}$

b) $y' = \frac{\cos\sqrt{x}}{2\sqrt{x}(1+\sin^2\sqrt{x})}$