Material de apoio – Exercícios - Derivadas

a)Dadas as funções deriváveis abaixo, determine as suas respectivas derivadas:

$f(x) = 5$ $f(x) = 3x$ $f(x) = \frac{x}{3}$ $f(x) = x^2$ $f(x) = x^6$ $f(x) = \frac{1}{x}$

$f(x) = \frac{1}{x^3}$ $f(x) = x$ $f(x) = x^{100}$ $f(x) = x^{-3}$ $g(x) = 12x$

$g(x) = -5x$ $g(x) = -\frac{9}{x}$ $g(x) = \frac{3}{2}x^2$ $g(x) = 53$ $g(x) = 8x^0$

$g(x) = 9x$ $g(x) = x^{-13}$ $g(x) = 4x^2$ $g(x) = \frac{1}{5}x^{-5}$

b) Dadas as funções deriváveis abaixo, determine as suas respectivas derivadas:

$g(x) = 3^x$ $g(x) = 4^x$ $g(x) = 100^x$ $g(x) = \frac{1}{10}.10^x$ $g(x) = e^x$

$f(x) = 8x^{11}$ $f(x) = -\frac{7}{3}x^3 - \frac{\sqrt{3}}{7}$ $f(x) = 5 + x + 3x^2$ $f(x) = 3 + 5x^2 + x^5$

$f(x) = x^3 + x^2 + x + 5$ $f(x) = 3 + 2x^n$ $f(x) = 4x^2 + sen\,x$ $f(x) = (x-1)^3$

$f(x) = -x + sen\,x - cos\,x$ $f(x) = ax - x^4$ $f(x) = 8x^4 - 3^x$

$f(x) = cos\,x - e^x$ $f(x) = \frac{x^4 - 5x - x4^x}{x}$

$f(x) = 5x^4 - 9x$ $f(x) = 5^x + e^x + sen\,x$

$f(x) = \sqrt{x^3 + 2}$ $f(x) = \sqrt[3]{x^2 + x + 1}$

$f(x) = \cos(x^2 + x)$ $f(x) = \text{sen}(x^2)$

$f(x) = \ln(\text{sen}\,x)$ $f(x) = (3x^2 + 1)^3$

$f(x) = \cos(3x)$ $f(x) = \ln(x^2 + 3)$ $f(x) = e^{3x}$

$f(x) = e^{\text{sen}\,x}$ $g(x) = \text{sen}(\cos x)$ $g(x) = \cos(e^x)$

$g(x) = e^{-5x}$ $g(t) = (t^2 + 3)^4$ $g(x) = \sec(3x)$

$g(x) = \cot g(x^2)$ $g(x) = \cos\sec(2x)$

$g(x) = \sec(tgx)$ $g(x) = \sqrt{e^x + e^{-x}}$

c)Dadas as funções deriváveis abaixo, determine as suas respectivas derivadas:

$g(x) = (3x^2 + x)(1 + x + x^3)$

$g(x) = x^2(x + x^4)(1 + x + x^3)$

$g(x) = x^3e^x$

$g(x) = xe^x + cos\,x$

$g(x) = x^4a^x$

$g(x) = a\,sen\,x + b\,cos\,x \quad (a,b \in \Re)$

$g(x) = x.e^x.cos\,x$

$g(x) = x^2 + 2e^x$

$g(x) = e^x.sen\,x\,.\,cos\,x$

$g(x) = 4 + 5x^2e^x$

$f(x) = \frac{2}{x^7}$

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

$f(x) = \frac{x+1}{x-1}$

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$f(x) = \dfrac{4x - 5}{3x + 2}$ $\qquad$ $f(x) = x^2 + \dfrac{1}{x^2}$

$f(x) = \dfrac{8 - x + 3x^2}{2 - 9x}$ $\qquad$ $f(x) = \dfrac{3x^2 + 2x}{7}$

$f(x) = \dfrac{x^3 - 1}{x^3 + 1}$ $\qquad$ $f(x) = \dfrac{x^2 + 2x + 5}{1 + x}$

$f(x) = \dfrac{1}{1 + x + x^2 + x^3}$

d)Dadas as funções deriváveis abaixo, determine as suas respectivas derivadas:

$g(x) = 3^{2x} + \ln(2x^3)$ $\qquad$ $g(x) = e^{-x^2} + \ln(2x + 1)$

$g(x) = e^{-x} - e^{-2x}$ $\qquad$ $g(x) = 2^{x^2} + 3^{2x}$

$g(x) = (3 + \cos x)^x$ $\qquad$ $f(x) = 10^x - 10^{-x}$

$f(x) = \dfrac{\operatorname{sen}(6x)}{24} + \dfrac{\operatorname{sen}(4x)}{16} + \dfrac{\operatorname{sen}(2x)}{8} + \dfrac{x}{4}$

$f(x) = e^{\cos x} + \cos(e^x)$ $\qquad$ $f(x) = xe^{3x}$ $\qquad$ $f(x) = x^3 e^{-3x}$ $\qquad$ $f(x) = x\ln(2x + 1)$

$f(x) = e^x \cos(2x)$ $\qquad$ $f(x) = (x + 2)^8 (x + 3)^6$ $\qquad$ $f(x) = (3x - 4)\sqrt[4]{(x + 1)^3}$ $\qquad$ $f(x) = \sqrt[3]{x\sqrt{x}}$

$f(x) = \dfrac{\operatorname{sen}^3(x)\cos(x)}{4}$ $\qquad$ $f(x) = \dfrac{3\operatorname{sen}(x)\cos(x)}{8}$

$f(x) = \dfrac{3x}{8} - \dfrac{\operatorname{sen}^3(x)\cos(x)}{4} - \dfrac{3\operatorname{sen}(x)\cos(x)}{8}$

$f(x) = \dfrac{2}{3}\cos^3(x)$ $\qquad$ $f(x) = \dfrac{2}{3}\cos^3(x) - \cos(x) - \dfrac{1}{5}\cos^5(x)$

Tabela utilizada para as derivações

Função	Derivada
$y = f(x)$	$\dfrac{dy}{dx} = f'(x)$
c (constante)	0 - zero
u^n	$n.u^{n-1}.u'$
$c.u^n$	$c.n.u^{n-1}.u'$
e^u	$u'.e^u$
e^{-u}	$-u'.e^{-u}$
a^u	$u'.a^u.\ln a$
$\sqrt{u}$	$\dfrac{u'}{2\sqrt{u}}$
$\ln u$	$\dfrac{u'}{u}$

$\log_a u$	$\dfrac{ú}{u\ln a} = \dfrac{u'\log e}{u}$
$\operatorname{sen} u$	$u'\cos u$
$\cos u$	$-u'\operatorname{sen} u$
tgu	$u'\sec^2 u$
$\sec u$	$u'\sec u.tgu$
$\cos\sec u$	$-u'\cos ecu.\cot gu$
$\cot gu$	$-u'\cos ec^2 u$
$\operatorname{arcsen} u$	$\dfrac{u'}{\sqrt{1-u^2}}$
$\arccos u$	$-\dfrac{u'}{\sqrt{1-u^2}}$
$arctgu$	$\dfrac{u'}{1+u^2}$

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$u.v$	$u'.v + u.v'$
$\frac{u}{v}$	$\frac{u'.v - u.v'}{v^2}$