

Técnicas Matemáticas de Resolución de Problemas

Curso 2005/2006

Escuela Universitaria de Ingeniería Técnica Agrícola

Departamento de Matemática Aplicada I

Derivación

6 Derivadas

Ejercicio 6.1 Calcular la derivada de las siguientes funciones:

- (a.) $y = x^3$ (b.) $y = x^8$ (c.) $y = 7x^5$ (d.) $y = \frac{3}{4}x^4$
(e.) $y = 11x^8$ (f.) $y = x^{10} - x^7 + x^4$ (g.) $y = x^{12} + x^6 - x^3$
(h.) $y = x^7 + x^4 - x$ (i.) $y = 10x^8 + 4x^4 - 5x$ (j.) $y = 15x^6 + 9x^3 - 2$
(k.) $y = 5x^6 + 4x^5 - 7x^2 + 9x - 12$ (l.) $y = 8x^9 - 2x^5 - 2x^4 + 2x + 19$
(m.) $y = 3x^7 - 3x^5 + 12x^4 - 4x - 9$ (n.) $y = x^{-7}$ (o.) $y = x^{-2}$
(p.) $y = x^{\frac{1}{3}}$ (q.) $y = \frac{1}{x^4}$ (r.) $y = \sqrt{x}$ (s.) $y = \sqrt[3]{x}$
(t.) $y = \sqrt[3]{x^2}$ (u.) $y = \sqrt[4]{x^3}$ (v.) $y = \frac{1}{\sqrt{x}}$ (w.) $y = \frac{1}{\sqrt[3]{x}}$
(x.) $y = \frac{1}{\sqrt[3]{x^5}}$ (y.) $y = \frac{1}{\sqrt[7]{x^4}}$ (z.) $y = \frac{\sqrt{x^3}}{\sqrt[3]{x^2}}$

Ejercicio 6.2 Calcular la derivada de las siguientes funciones:

- (a.) $y = \frac{x^2-3}{x^3-x}$ (b.) $y = \frac{x^3-3x^2}{x^2-x}$ (c.) $y = \frac{x-5}{x^3+x}$ (d.) $y = \frac{x^2+1}{x^3+1}$
(e.) $y = \frac{x^4+x}{2x^2+1}$ (f.) $y = \frac{3x^3+1}{x^4+1}$ (g.) $y = \frac{2x+5}{x^3+x}$ (h.) $y = \frac{x-5}{x^3-x}$
(i.) $y = \frac{x-1}{x^3}$ (j.) $y = \ln(3x)$ (k.) $y = \ln(x^3)$ (l.) $y = \ln|\sqrt{x}|$
(m.) $y = \ln(x^2 + 1)$ (n.) $y = \ln(2x^3 + 3x + 1)$
(o.) $y = \ln(5x^4 - 2x + 5)$ (p.) $y = \ln(3x^5 - x + 4)$
(q.) $y = \ln(x^6 + x^4 + 2x^3 - 7)$ (r.) $y = 3^x$ (s.) $y = 5^x \cdot 7^x$
(t.) $y = \frac{3^x}{6^x}$ (u.) $y = e^{3x+1}$ (v.) $y = e^{x^2+x+1}$ (w.) $y = 7^{3x+1}$
(x.) $y = 25^{x^4+x+1}$ (y.) $y = 14^{1-x^2}$ (z.) $y = 2^{x^3+x^2-1}$

Ejercicio 6.3 Calcular la derivada de las siguientes funciones:

- (a.) $y = \operatorname{sen}(3x + 1)$ (b.) $y = \operatorname{sen}(x^2 + 1)$ (c.) $y = \operatorname{sen}(5x^4 + 7x + 1)$
(d.) $y = \operatorname{sen}(3x^4 + 8)$ (e.) $y = \operatorname{sen}(x^3)$ (f.) $y = \operatorname{sen}(\ln x)$
(g.) $y = 3\operatorname{sen}(x)$ (h.) $y = \frac{\operatorname{sen}(x)}{3}$ (i.) $y = \operatorname{sen}(\operatorname{sen}(x))$
(j.) $y = \operatorname{sen}(3^x)$ (k.) $y = 7\cos(x)$ (l.) $y = \frac{\cos(x)}{5}$
(m.) $y = \cos(3x + 1)$ (n.) $y = \cos(x^2 + 1)$ (o.) $y = \cos(5x^2 + 7x + 1)$
(p.) $y = \cos(5x^4 - 7x^2)$ (q.) $y = \cos(x^3)$ (r.) $y = \cos(\ln(x))$
(s.) $y = \cos(\cos(x))$ (t.) $y = \cos(3^x)$ (u.) $y = \operatorname{arcsen}(\sqrt{x})$
(v.) $y = \operatorname{arcsen}(x^2)$ (w.) $y = 7\operatorname{arctg}(x)$ (x.) $y = \frac{\operatorname{arctg}(x)}{5}$
(y.) $y = \operatorname{arctg}(2x + 1)$ (z.) $y = \operatorname{arctg}(3x^2 + x)$

Ejercicio 6.4 Calcular la derivada de las siguientes funciones:

- (a.) $y = \arctg(x^2)$ (b.) $y = \arctg(\ln(x))$ (c.) $y = \arctg(x^2 + x)^7$
 (d.) $y = (2x^2 + x^3)^6$ (e.) $y = (10x^3 + 8x^4 + x)^{10}$ (f.) $y = (2x^{15} + 2x^3)^{-8}$
 (g.) $y = \sqrt[3]{8x^{-3} + 2x^{-2}}$ (h.) $y = \frac{1}{\sqrt{10x^3 + x^6}}$ (i.) $y = \frac{k}{\sqrt[3]{2x^5 + 8x}}$
 (j.) $y = \sqrt[10]{7x^5 + 2x^2}$ (k.) $y = \sqrt{10x^{12} + x - 3}$ (l.) $y = \sqrt[3]{3x^6 - 2x}$
 (m.) $y = \frac{5}{\sqrt[6]{(3x^5 - 2x)^5}}$ (n.) $y = (10x^4 + 8x^3)(5x^2 + 2x)$
 (o.) $y = (40x^3 + 24x^2)(5x^2 + 2x) + (10x^4 + 8x^3)(10x + 2)$
 (p.) $y = (7x^{-3} + 2x^{\frac{1}{3}})(8x^{\frac{3}{4}} - 2x^5)$ (q.) $y = (3x^{-2} + x)(10x^4 + 8)(3x^3 + 2x)$
 (r.) $y = (4x^3 + 2x)(\sqrt{x} + 2\sqrt{x^3})(8x^5 + 2x)$ (s.) $y = \frac{3x^{-5}}{8x^2 + 5x}$
 (t.) $y = \frac{30x^3 + 2x^4}{10x^2 + 8}$ (u.) $y = \frac{10x^3 + 2x}{8x^5 - 7x^3}$ (v.) $y = \frac{x^3}{x^4 + 8}$ (w.) $y = \frac{\sqrt{x} + 2}{\sqrt{x^2 + 3}}$
 (x.) $y = \frac{(x-2)^2}{\sqrt{x+5}}$ (y.) $y = \frac{(3x^2-2)^{\frac{3}{2}}}{\sqrt[3]{x^2+5x}}$ (z.) $y = 3 \cdot 2^x$

Ejercicio 6.5 Calcular la derivada de las siguientes funciones:

- (a.) $y = (\ln 8)^x$ (b.) $y = 10^{5x^4 + x}$ (c.) $y = 8^{3x^6 - 2x}$
 (d.) $y = 3^{\ln(x) + x^5}$ (e.) $y = 10^{(3x^6 + 2x)^4}$ (f.) $y = 3^{2^x}$ (g.) $y = 8^{\ln(x)}$
 (h.) $y = e^{\sqrt{x^3 + \ln(x) + e^x}}$ (i.) $y = e^{3x^4 + \ln(x)}$ (j.) $y = \frac{x^4 + 2x^3 - 2}{x^4 - 2x}$
 (k.) $y = \frac{(2x^3 + 2x^5)^3}{3x^3 + 2x}$ (l.) $y = \frac{8^x + e^x - \ln(x)}{5x^2 + \ln(x^3) - e^{x^4}}$ (m.) $y = (x^3 + 1)\sqrt[4]{x^2 - 1}$
 (n.) $y = \ln(\sqrt{\frac{1+\sqrt{x}}{1-\sqrt{x}}})$ (o.) $y = (5x^3 + 2x) \cdot 10^x$ (p.) $y = 5^x \ln(x)$
 (q.) $y = \sqrt{(x-1)(8+x)}$ (r.) $y = (3x + 2x^3 - 5x^2)^{\frac{3}{4}} \cdot e^{\ln(x) + e^x}$
 (s.) $y = \arcsen(\ln(x))$ (t.) $y = \frac{(3x^2 + e^{-x})(\ln(e^{x^2}) + 2)}{\sqrt{5x - \ln(x^2)}}$ (u.) $y = \sen(\sqrt{\ln(x) + \sqrt{x}})$
 (v.) $y = \arctg(x \sen(x))$ (w.) $y = \sen(x + \sen(x^2 - 5x)^2)$
 (x.) $y = \sen(x) - \sen\sqrt{x^3 + 2}$ (y.) $y = \cos\sqrt{3x^2 - e^{2x}}$

Ejercicio 6.6 Calcula la derivada de las siguientes funciones:

- (a.) $y = \frac{3-2x}{3+2x}$ (b.) $y = \sqrt{\frac{x-1}{x+1}}$ (c.) $y = \sqrt{1 + \sqrt{x}}$
 (d.) $y = (x-a)\sqrt{2ax - x^2} + a^2 \arcsen(\frac{x-a}{a})$ (e.) $y = \frac{\sqrt{x^2-4}}{x^2} + \frac{1}{2} \arcsen(\frac{x}{2})$
 (f.) $y = x \sen(\frac{1}{x}) + \sqrt{1-x^2}$ (g.) $y = \arctg(\frac{1+x}{1-x})$
 (h.) $y = \ln(x + \sqrt{1+x^2})$ (i.) $y = \ln(\ln(\tg(x)))$
 (j.) $y = x[\sen(\ln(x)) - \cos(\ln(x))]$ (k.) $y = \arctg(\sen(\ln(\cos(x))))$
 (l.) $y = \frac{e^x(1-e^x)}{\ln(1-x)}$ (m.) $y = \tg(x^{\cos x})$ (n.) $y = \cos(x^{\tg(x)})$
 (o.) $y = (e^x)^{e^x}$ (p.) $y = x^{x^x}$ (q.) $y = \sqrt{\sqrt{\sqrt{x}}}$
 (r.) $y = (\arctg(x))^{\arctg(x)}$ (s.) $y = \ln(\arctg(x) + e^x - \sen(\cos(x)))$
 (t.) $y = \tg(\tg(\tg(x)))$ (u.) $y = \frac{\tg(x)}{\sen(x) - \cos(x)}$ (v.) $y = x\sqrt{\sen(x) + \cos(x)}$