REGLAS DE DERIVACIÓN

a. $f(x) = k \rightarrow f'(x) = 0$

b. $f(x) = x \rightarrow f'(x) = 1$

c. $f(x) = x^n \rightarrow f'(x) = n \cdot x^{n-1}$

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

e. $f(x) = \sqrt{x} \rightarrow f'(x) = \frac{1}{2\sqrt{x}}$

f. $f(x) = k \cdot u(x) \rightarrow f'(x) = k \cdot u'(x)$

g. $f(x) = u(x) + v(x) \rightarrow f'(x) = u'(x) + v'(x)$

h. $f(x) = u(x) \cdot v(x) \rightarrow f'(x) = u'(x) \cdot v(x) + u(x) \cdot v'(x)$

i. $f(x) = \frac{u(x)}{v(x)} \rightarrow f'(x) = \frac{u'(x) \cdot v(x) - u(x) \cdot v'(x)}{u^2(x)}$

j. $f(x) = [u(x)]^n \rightarrow f'(x) = n \cdot [u(x)]^{n-1} u'(x)$

k. $f(x) = \sqrt{u(x)} \rightarrow f'(x) = \frac{u'(x)}{2\sqrt{u(x)}}$

l. $f(x) = sen\ (u(x)) \rightarrow f'(x) = \cos\big(u(x)\big) \cdot u'(x)$

m. $f(x) = \cos\big(u(x)\big) \rightarrow f'(x) = -sen\big(u(x)\big) \cdot u'(x)$

n. $f(x) = tg\big(u(x)\big) \rightarrow f'(x) = \frac{u'(x)}{cos^2 u(x)}$

o. $f(x) = arc\ sen\ (u(x)) \rightarrow f'(x) = \frac{u'(x)}{\sqrt{1-u^2(x)}}$

p. $f(x) = \text{arc}\cos\big(u(x)\big) \rightarrow f'(x) = \frac{-u'(x)}{\sqrt{1-u^2(x)}}$

q. $f(x) = arc\ tg\big(u(x)\big) \rightarrow f'(x) = \frac{u'(x)}{1+u^2(x)}$

r. $f(x) = e^{u(x)} \rightarrow f'(x) = e^{u(x)} \cdot u'(x)$

s. $f(x) = a^{u(x)} \rightarrow f'(x) = a^{u(x)} \cdot lna \cdot u'(x)$

t. $f(x) = \ln(u(x)) \rightarrow f'(x) = \frac{u'(x)}{u(x)}$

u. $f(x) = log_a(u(x)) \rightarrow f'(x) = \frac{u'(x)}{u(x) \cdot lna}$

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Ejemplos:

a. $f(x) = 5 \rightarrow f'(x) = 0$

b. $f(x) = 3x \rightarrow f'(x) = 3 \cdot 1 = 3$

c. $f(x) = x^4 \rightarrow f'(x) = 4 \cdot x^3$

d. $f(x) = 7x^2 \rightarrow f'(x) = 7 \cdot 2 \cdot x = 14x$

e. $f(x) = 3x^3 - 5x^2 + 7x + 1 \rightarrow f'(x) = 9x^2 - 10x + 7$

f. $f(x) = (3x^2 + 2x - 3)^3 \rightarrow f'(x) = 3 \cdot (3x^2 + 2x - 3)^2 \cdot (6x + 2)$

g. $f(x) = \sqrt{x^2 - 3} \rightarrow f'(x) = \frac{2x-3}{2\sqrt{x^2-3x}}$

h. $f(x) = \sqrt[3]{x^2 + 1} = (x^2 + 1)^{\frac{1}{3}} \rightarrow f'(x) = \frac{1}{3} \cdot (x^2 + 1)^{\frac{1}{3}-1} \cdot (2x)$

i. $f(x) = (3x - 5) \cdot \sqrt[3]{x} \rightarrow f'(x) = 3\sqrt[3]{x} + (3x - 5) \cdot \frac{1}{3\sqrt[3]{x^2}}$

j. $f(x) = \frac{3x+1}{x^2} \rightarrow f'(x) = \frac{3x^2-2x\cdot(3x+1)}{x^4} = \frac{3x^2-6x^2-2x}{x^4} = \frac{-3x^2-2x}{x^4} = \frac{-3x-2}{x^3}$

k. $f(x) = sen(x^2 + 5x - 1) \rightarrow f'(x) = \cos(x^2 + 5x - 1) \cdot (2x + 5)$

l. $f(x) = cos\sqrt{x^2 + 5x - 1} \rightarrow f'(x) = -sen\sqrt{x^2 + 5x - 1} \cdot \frac{-1\cdot(2x+5)}{2\sqrt{x^2+5x-1}}$

m. $f(x) = tg(x^3 + 1) \rightarrow f'(x) = \frac{3x^2}{cos^2(x^3+1)}$

n. $f(x) = sen^3(2x - 1) \rightarrow f'(x) = 3 \cdot sen^2(2x - 1) \cdot \cos(2x - 1) \cdot 2 = 6 \cdot sen^2(2x - 1) \cdot \cos(2x - 1)$

o. $f(x) = arc\cos\sqrt{2x + 3} \rightarrow f'(x) = \frac{-\frac{2}{2\sqrt{2x+3}}}{\sqrt{1-\left(\sqrt{2x+3}\right)^2}} = \frac{-\frac{1}{\sqrt{2x+3}}}{\sqrt{2x-2}} = \frac{-1}{\sqrt{2x-2}\cdot\sqrt{2x+3}} =$

$\frac{-1}{\sqrt{4x^2+2x-6}}$

p. $f(x) = arc\ sen\ x^2 \rightarrow f'(x) = \frac{2x}{\sqrt{1-(x^2)^2}} = \frac{2x}{\sqrt{1-x^4}}$

q. $f(x) = arc\ tg\ \frac{1}{x} \rightarrow f'(x) = \frac{-\frac{1}{x^2}}{1+\frac{1}{x^2}} = \frac{-\frac{1}{x^2}}{\frac{x^2+1}{x^2}} = \frac{-1}{x^2+1}$

r. $f(x) = e^{x^2+3x} \rightarrow f'(x) = e^{x^2+3x} \cdot (2x + 3)$

s. $f(x) = 3^{\sqrt{x}} \rightarrow f'(x) = 3^{\sqrt{x}} \cdot ln3 \cdot \frac{1}{2\sqrt{x}}$

t. $f(x) = \ln(x^3 - 5x^2) \rightarrow f'(x) = \frac{3x^2-5x}{x^3-5x^2}$

u. $f(x) = log_3(8x^5) \rightarrow f'(x) = \frac{40x^4}{8x^5\cdot ln3}$

S0-1. Ejercicios: pág. 40, ej. 6, 7; pág. 58, ej. 38, 39.

****pág. 58, ej. 38 d, g, h, i; 39 h***