

Derivarea funcțiilor reale

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I DERIVATI:

$$1) 2x^7 + 3x + 7 = f(x); \quad f'(x) = ?$$

$$(f + g)' = f' + g'$$

$$(c \cdot f)' = c \cdot f' \quad c = \text{constanță}$$

$$(c + f)' = (c)' + f' = 0 + f' = f'$$

$$(u^n)' = n \cdot u^{n-1} \cdot u'$$

$$\begin{aligned} f'(x) &= (2x^7 + 3x + 7)' = (2x^7)' + (3x)' + (7)' = \\ &= 2 \cdot (x^7)' + 3 \cdot (x)' + 0 = 2 \cdot 7x^{7-1} \cdot 1 + 3 \cdot 1 + 0 \\ &= 14x^6 + 3 \end{aligned}$$

$$2) x^{100} + 3x^2 + 11x + 9 = g(x); \quad g'(x) = ?$$

Aceleși formule

$$\begin{aligned} g'(x) &= (x^{100} + 3x^2 + 11x + 9)' = (x^{100})' + (3x^2)' + (11x)' + (9)' \\ &= 100 \cdot x^{100-1} \cdot 1 + 3 \cdot 2x^{2-1} \cdot 1 + 11 \cdot 1 + 0 = 100x^{99} + \\ &+ 6x + 11 \end{aligned}$$

$$3) e^x + \sin 2x + x^3 = h(x); \quad h'(x) = ?$$

$$(e^u)' = e^u \cdot u'$$

$$(\sin u)' = \cos u \cdot u'$$

$$(u^n)' = n \cdot u^{n-1} \cdot u'$$

$$h'(x) = (e^x + \sin 2x + x^3)' = (e^x)' + (\sin 2x)' + (x^3)'$$

$$= e^x \cdot (x)' + (\cos 2x) \cdot (2x)' + 3x^{3-1} \cdot 1$$

$$= e^x \cdot 1 + (\cos 2x) \cdot 2 + 3x^2 = e^x + 2\cos 2x + 3x^2$$

Folosind aceleasi formule, derivati:

- 1) $(3x^6 + 4x + 9)' = ?$
- 2) $(x^{200} + 5x^4 + 10x + 20)' = ?$
- 3) $(e^{2x} + \sin x + x^7)' = ?$

II DERIVATI:

$$1) f(x) = \frac{2x+1}{5x+7}$$

$$\left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$$

$$f'(x) = \frac{(2x+1)' \cdot (5x+7) - (2x+1) \cdot (5x+7)'}{(5x+7)^2} =$$

$$= \frac{(2 \cdot 1 + 0) \cdot (5x+7) - (2x+1) \cdot (5 \cdot 1 + 0)}{(5x+7)^2}$$

$$f'(x) = \frac{2 \cdot (5x+7) - (2x+1) \cdot 5}{(5x+7)^2} = \frac{2 \cdot 5x + 2 \cdot 7 - 5 \cdot 2x - 5 \cdot 1}{(5x+7)^2}$$

$$= \frac{\cancel{10x} + 14 - \cancel{10x} - 5}{(5x+7)^2} = \frac{14-5}{(5x+7)^2} = \frac{9}{(5x+7)^2}$$

$$2) \quad g(x) = (2x^3 + 6x + 7) \cdot e^{3x}$$

$$(f \cdot g)' = f' \cdot g + f \cdot g'$$

$$(e^u)' = e^u \cdot u'$$

$$(u^n)' = n \cdot u^{n-1} \cdot u'$$

$$(f + g)' = f' + g' \quad (c \cdot f)' = c \cdot f' \quad c = \text{constantă}$$

$$g'(x) = \left[(2x^3 + 6x + 7) \cdot e^{3x} \right]' = (2x^3 + 6x + 7)' \cdot e^{3x}$$

$$+ (2x^3 + 6x + 7) \cdot (e^{3x})' = (2 \cdot 3x^{3-1} \cdot 1 + 6 \cdot 1 + 0) \cdot e^{3x}$$

$$+ (2x^3 + 6x + 7) \cdot e^{3x} \cdot 3 \cdot 1 = (6x^2 + 6) \cdot e^{3x} +$$

$$+ (2x^3 + 6x + 7) \cdot e^{3x} \cdot 3$$

Folosind aceleasi formule, derivati:

$$1) f'(x) = \left(\frac{4x+3}{9x+8} \right)' = ?$$

$$2) g'(x) = \left[(5x^3 + 4x^2 + 9) \cdot e^{4x} \right]' = ?$$

III DERIVATI:

$$1) f(x) = \sqrt{2x^3 + 4x^2 + 5x + 100}$$

$$(\sqrt{u})' = \frac{u'}{2\sqrt{u}}$$

$$f'(x) = \left(\sqrt{2x^3 + 4x^2 + 5x + 100} \right)' = \frac{(2x^3 + 4x^2 + 5x + 100)'}{2\sqrt{2x^3 + 4x^2 + 5x + 100}}$$

$$= \frac{2 \cdot 3x^{3-1} \cdot 1 + 4 \cdot 2x^{2-1} \cdot 1 + 5 \cdot 1 + 0}{2\sqrt{2x^3 + 4x^2 + 5x + 100}} = \frac{6x^2 + 8x + 5}{2\sqrt{2x^3 + 4x^2 + 5x + 100}}$$

Folosind aceiasi formula, derivati:

$$1) f(x) = \left(\sqrt{5x^2 + 6x + 2} \right)' = ?$$

$$2) g(x) = \left(\sqrt{6x'' + 1} \right)' = ?$$