DER-A2-008-*Testo*

Calcolare la DERIVATA della seguente funzione:

$$y = \frac{\sqrt{3x} - \sin\cos x}{\sqrt{\log\left(x^3+2\right)}}$$

DER-A2-008-*Procedimento*

Tipo: $y = \frac{f}{g} \quad \rightarrow \quad y' = \frac{f' \cdot g - g' \cdot f}{g^2}$

$$y' = \frac{D_1\left[\sqrt{3x} - \sin\cos x\right] \cdot \sqrt{\log\left(x^3+2\right)} - D_2\left[\sqrt{\log\left(x^3+2\right)}\right] \cdot \left(\sqrt{3x} - \sin\cos x\right)}{\left[\sqrt{\log\left(x^3+2\right)}\right]^2}$$

$D_1\left[\sqrt{3x} - \sin\cos x\right] \rightarrow$ Tipo: $\sqrt{f} - \sin f = \frac{1}{2\sqrt{f}} \cdot f' - \cos f \cdot f'$

$$D_1 = \frac{1}{2\sqrt{3x}} \cdot D[3x] - \cos\cos x \cdot D[\cos x] = \frac{1}{2\sqrt{3x}} \cdot 3 - \cos\cos x \cdot (-\sin x) = \frac{3}{2\sqrt{3x}} + \sin x(\cos\cos x)$$

$D_2\left[\sqrt{\log\left(x^3+2\right)}\right] \rightarrow$ Tipo: $\sqrt{f} = \frac{1}{2\sqrt{f}} \cdot f'$ con $f(x) = \log g(x) \rightarrow f' = \frac{1}{g} \cdot g'$

$$D_2 = \frac{1}{2\sqrt{\log\left(x^3+2\right)}} \cdot \frac{1}{x^3+2} \cdot 3x^2 = \frac{3x^2}{2\left(x^3+2\right)\sqrt{\log\left(x^3+2\right)}}$$

$$y' = \frac{\left[\frac{3}{2\sqrt{3x}} + \sin x(\cos\cos x)\right] \cdot \sqrt{\log\left(x^3+2\right)} - \left[\frac{3x^2}{2\left(x^3+2\right)\sqrt{\log\left(x^3+2\right)}}\right] \cdot \left(\sqrt{3x} - \sin\cos x\right)}{\left[\sqrt{\log\left(x^3+2\right)}\right]^2}$$

DER-A2-008-*Soluzione*

$$y' = \frac{3 + 2\sqrt{3x}\sin x(\cos\cos x)}{2\sqrt{3x}\sqrt{\log\left(x^3+2\right)}} - \frac{3x^2\left(\sqrt{3x} - \sin\cos x\right)}{2\left(x^3+2\right)\sqrt{\log^3\left(x^3+2\right)}}$$