

Esercizio n. 97

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Applicando le regole di derivazione calcolare la derivata prima delle seguenti funzioni algebriche:

1. $f(x) = (x - 1) \sqrt{x^2 - 2x + 2}$

2. $f(x) = \frac{x}{\sqrt{1-4x^2}}$

3. $f(x) = \sqrt{1 + \sqrt{x}}$

4. $f(x) = (x^2 + 3)^4 (2x^3 - 5)^3$

5. $s(t) = \frac{t^2+2}{3-t^2}$

Soluzioni

1.

$$\begin{aligned} f'(x) &= \sqrt{x^2 - 2x + 2} + (x - 1) \frac{2x - 1}{2\sqrt{x^2 - 2x + 2}} \\ &= \frac{2x^2 - 4x + 3}{\sqrt{x^2 - 2x + 2}} \end{aligned}$$

2.

$$\begin{aligned} f'(x) &= \frac{\sqrt{1 - 4x^2} + x \frac{8x}{2\sqrt{1-4x^2}}}{1 - 4x^2} \\ &= \frac{1}{\sqrt{(1 - 4x^2)^3}} \end{aligned}$$

3.

$$\begin{aligned} f'(x) &= \frac{1}{2\sqrt{1 + \sqrt{x}}} \cdot \frac{1}{2\sqrt{x}} \\ &= \frac{1}{4\sqrt{x + \sqrt{x}}} \end{aligned}$$

4.

$$\begin{aligned} f'(x) &= 8x (x^2 + 3)^3 (2x^3 - 5)^3 + 18x^2 (x^2 + 3)^4 (2x^3 - 5)^2 \\ &= 2x (x^2 + 3)^3 (2x^3 - 5)^2 (17x^3 + 27x - 20) \end{aligned}$$

5.

$$\begin{aligned}\frac{ds}{dt} &= \frac{2t(3-t^2) + 2t(t^2+2)}{(3-t^2)^2} \\ &= \frac{10t}{(3-t^2)^2}\end{aligned}$$