Answer on Question #49864 – Math – Calculus

Given: x^2[f(x)]^2=9; and f(-1) Find f''(-1) by implicit differentiation.

Solution.

$$x^2[f(x)]^2 = 9 \rightarrow \frac{d}{dx}\{x^2[f(x)]^2\} = \frac{d}{dx}(9) \rightarrow$$

$$2xf^2 + 2x^2ff' = 0 \rightarrow divide\ by\ 2xf \rightarrow f'(x) = -\frac{f(x)}{x}$$

$$f''(x) = -\frac{xf'(x) - f(x)}{x^2} = -\frac{-f(x) - f(x)}{x^2} = \frac{2f(x)}{x}$$

$$f''(-1) = \frac{2f(-1)}{-1} = -2f(-1)$$