ANSWER on Question #71730 – Math – Calculus

QUESTION

Given

$$y(x) = 2x^5 + x^2 - \frac{5}{x^2}$$

Find dy/dx

SOLUTION

As we know

$$\frac{d}{dx}\left(c \cdot y(x)\right) = c \cdot \frac{dy}{dx}$$

$$\frac{d}{dx}(x^n) = n \cdot x^{n-1}$$

$$\frac{d}{dx}\left(f(x) \pm g(x)\right) = \frac{d}{dx}\left(f(x)\right) \pm \frac{d}{dx}\left(g(x)\right)$$

(More information:)

In our case,

$$\frac{d}{dx}\left(2x^5 + x^2 - \frac{5}{x^2}\right) = \frac{d}{dx}(2x^5) + \frac{d}{dx}(x^2) - \frac{d}{dx}\left(\frac{5}{x^2}\right) =$$

$$= 2 \cdot 5 \cdot x^{5-1} + 2 \cdot x^{2-1} - 5 \cdot \frac{d}{dx}(x^{-2}) = 10x^4 + 2x - 5 \cdot (-2) \cdot x^{-2-1} =$$

$$= 10x^4 + 2x + 10x^{-3} \equiv 10x^4 + 2x + \frac{10}{x^3}$$

Conclusion,

$$y(x) = 2x^5 + x^2 - \frac{5}{x^2} \rightarrow \boxed{\frac{dy}{dx} = 10x^4 + 2x + \frac{10}{x^3}}$$

ANSWER: $\frac{dy}{dx} = 10x^4 + 2x + \frac{10}{x^3}$