Question

Differentiate $y = x^2(2x - 5)^4$ with respect x.

Solution

We have differentiation product of functions

$$y' = (x^2(2x-5)^4)' = (x^2)'(2x-5)^4 + x^2((2x-5)^4)' =$$

$$= 2x(2x-5)^4 + x^2 \cdot 4(2x-5)^3 \cdot (2x-5)' = 2x(2x-5)^4 + x^2 \cdot 4(2x-5)^3 \cdot 2 =$$

$$= (2x-5)^3(2x(2x-5) + 8x^2) = (2x-5)^3(4x^2 - 10x + 8x^2) = (2x-5)^3(12x^2 - 10x) =$$

$$= 2x(6x-5)(2x-5)^3.$$

Answer: $y' = 2x(6x-5)(2x-5)^3$.