Answer on Question #79018 – Math – Calculus

Question

Calculate the approximate value of
Integration of x^3 dx within limit 0 to 6
by taking 6 subintervals of equal length
and applying Simpson's rule.

Solution

$$\int_a^b f(x)dx \approx \frac{b-a}{3n}[f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + 2f(x_4) + \cdots + 4f(x_{n-1}) + f(x_n)].$$

$$\int_0^6 x^3 dx \approx \frac{6-0}{3*6}[0^3 + 4 \cdot 1^3 + 2 \cdot 2^3 + 4 \cdot 3^3 + 2 \cdot 4^3 + 4 \cdot 5^3 + 6^3] =$$

$$= 324.$$