Student: Arfaz Hossain **Date:** 11/28/21	**Instructor:** UVIC Math **Course:** MATH 100 (A01, A02, A03) Fall 2021 **Assignment:** Assignment 9

Express the limit $\lim\limits_{\|P\|\to 0}\sum\limits_{k=1}^{n}\left(c_k^5-2c_k\right)\Delta x_k$, where P is a partition of $[-3,1]$, as a definite integral.

The symbolism $\int_a^b f(x)dx$ is related to $\lim\limits_{\|P\|\to 0}\sum\limits_{k=1}^{n} f\left(c_k\right)\Delta x_k$, where P is a partition of the interval $\left[x_1,x_2\right]$, as follows.

The symbol $\int_a^b$ replaces $\lim\limits_{\|P\|\to 0}\sum\limits_{k=1}^{n}$.

The partition P of $\left[x_1,x_2\right]$ becomes the range of integration, $a=x_1$, $b=x_2$.

The function $f(c_k)$ becomes $f(x)$.

The length of the sub-intervals Δx_k becomes dx.

In this problem, $a=-3$ and $b=1$.

The integral sign with the limits of integration becomes $\int_{-3}^{1}$.

In the given summation, $f(c_k)=c_k^5-2c_k$.

In the integration, $f(x)$ replaces $f(c_k)$ and dx replaces Δx_k. Substituting $x=c_k$ into $f(c_k)=c_k^5-2c_k$, results in $f(x)=x^5-2x$.

Thus, $\lim\limits_{\|P\|\to 0}\sum\limits_{k=1}^{n}\left(c_k^5-2c_k\right)\Delta x_k$, where P is a partition of $[-3,1]$, expressed as a definite integral is $\int_{-3}^{1}\left(x^5-2x\right)dx$.