Student: Arfaz Hossain	**Course:** MATH 100 (A01, A02, A03) Fall 2021
Instructor: UVIC Math	**Book:** Thomas' Calculus Early Transcendentals, 14e
Date: 12/07/21	**Time:** 18:09

Find the average rate of change of the function over the given intervals.

$f(x) = 3x^3 + 3;$ **a)** $[2,4]$,   **b)** $[-2,2]$

a) The average rate of change of a function f(x) over the interval $\left[x_1, x_2\right]$ is as follows.

$$\frac{\Delta y}{\Delta x} = \frac{f\left(x_2\right) - f\left(x_1\right)}{x_2 - x_1}$$

For the function $f(x) = 3x^3 + 3$ and interval $[2,4]$, the average rate of change is as follows.

$$\frac{\Delta y}{\Delta x} = \frac{\left[(3)(4)^3 + 3\right] - \left[(3)(2)^3 + 3\right]}{4 - 2}$$

$$\frac{\Delta y}{\Delta x} = 84$$

Thus, the average rate of change of the function $3x^3 + 3$ over the interval $[2,4]$ is 84.

b) For the function $3x^3 + 3$ and interval $[-2,2]$,

$$\frac{\Delta y}{\Delta x} = \frac{\left[(3)(2)^3 + 3\right] - \left[(3)(-2)^3 + 3\right]}{2 - (-2)}.$$

$$\frac{\Delta y}{\Delta x} = 12$$

Thus, the average rate of change of the function $3x^3 + 3$ over the interval $[-2,2]$ is 12.