MATH 110 Problem Set 4.1

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The following problems based on Section 4.1 of the textbook will help you study. *You do not need to hand in solutions to these problems.*

1. (Based on 4.1.26)
   (a) Use the definition of area to find an expression for the area under the curve $y = x^3$ from 0 to 1 as a limit.
   (b) Use the following formula for the sum of the cubes of the first n integers to evaluate the limit in part (a).

$$1^3 + 2^3 + 3^3 + \cdots + n^3 = \left[\frac{n(n+1)}{2}\right]^2$$

2. (Based on 4.1.24) Determine a region the area of which is equal to the limit $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{2}{n}\left(5 + \frac{2i}{n}\right)^{10}$. Do not evaluate the limit.

You may find the following additional exercises from Section 4.1 helpful.

4.1 C-level: 1–8, 13–20, 21–23, 24–25;
B-level: 7–8, 20–21;
A-level: 27–28, 32