

Name _____

November 15, 2016

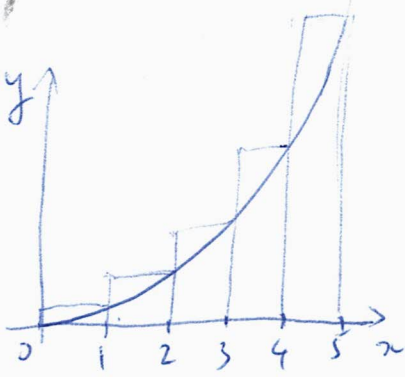
Quiz 8

1. Evaluate the area under the graph $f(x) = x^2$ from $x = 0$ to $x = 5$ using five approximating rectangles and right endpoints. Is your estimate an overestimate or an underestimate?

2. Express the following limit as a definite integral

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1}{n} \sqrt{1 + \frac{i}{n}}$$

①



$$\Delta x = \frac{5-0}{5} = 1$$

$$x_0 = 0$$

$$x_1 = 1$$

$$x_2 = 2$$

$$x_3 = 3$$

$$x_4 = 4$$

$$x_5 = 5$$

Right endpoints : $x_1^* = 1$, $x_2^* = 2$, $x_3^* = 3$, $x_4^* = 4$, $x_5^* = 5$.

$$\text{Area} \approx \sum_{i=1}^5 f(x_i^*) \Delta x = \sum_{i=1}^5 (x_i^*)^2 \times 1 = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 55.$$

This is an overestimate: the value of f at the right endpoint of each subinterval is the maximum value of f in that subinterval.

② There are multiple correct answers to this question. Two of them are $\int_1^2 \sqrt{x} \, dx$ and $\int_0^1 \sqrt{1+x} \, dx$.