

CSC 401

Lectures on **Analysis of Algorithms**

by

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Computer Science
CSUDH

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CSC 401

Lecture 2 Mathematical Background

Short Review - continued

Mathematical Background

Theorem - part one

For every non-decreasing function f

$$\int_{a-1}^b f(x) \, dx \leq \sum_{i=a}^b f(i) \leq \int_a^{b+1} f(x) \, dx$$

Theorem - part one

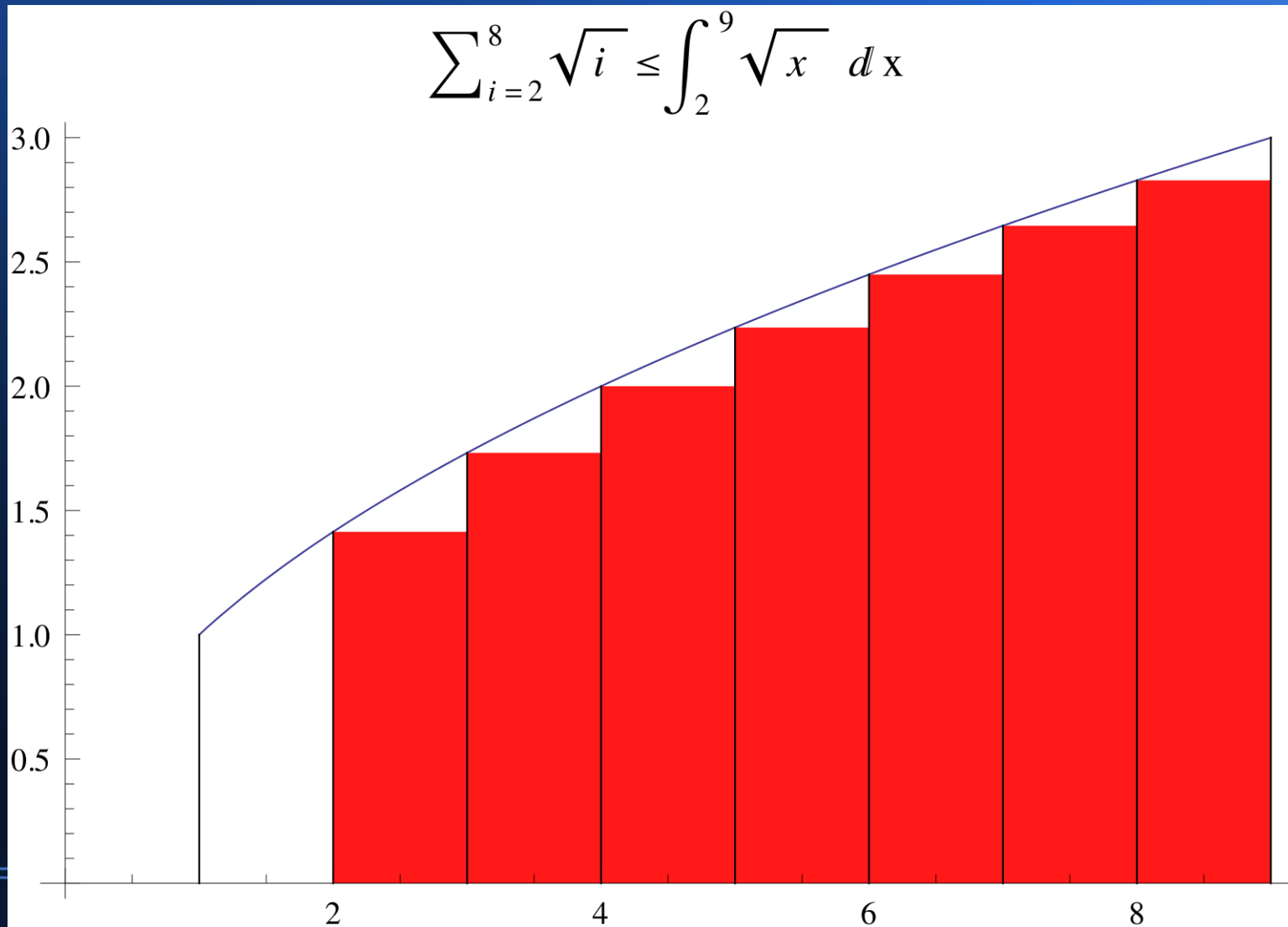
For every non-decreasing function f

$$\int_{a-1}^b f(x) \, dx \leq \sum_{i=a}^b f(i) \leq \int_a^{b+1} f(x) \, dx$$

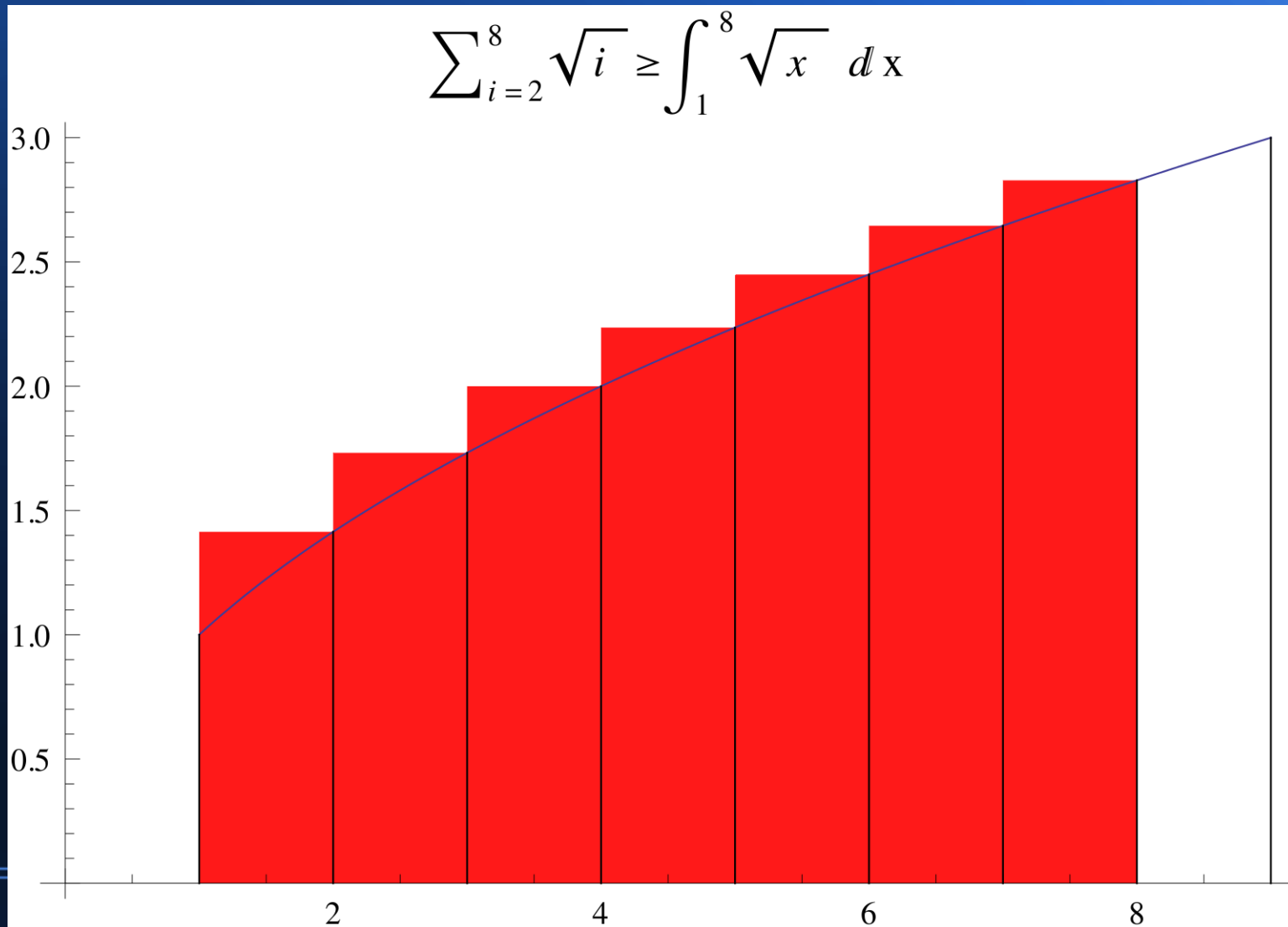
Example

$$\int_1^8 \sqrt{x} \, dx \leq \sum_{i=2}^8 \sqrt{i} \leq \int_2^9 \sqrt{x} \, dx$$

Mathematical Background



Mathematical Background



Mathematical Background

For every non-increasing function f

$$\int_a^{b+1} f(x) dx \leq \sum_{i=a}^b f(i) \leq \int_{a-1}^b f(x) dx$$

Mathematical Background

Make sure to remember MAT 191-193