Watch. Practice. Understand. | Lesson 296

Calculus Riemann Sum with Definite Integrals

Watch the matching video: https://www.youtube.com/watch?v=TLj1pP7gRPM

Practice focus: Riemann sums

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Approximate the integral of x^2 on [0,2] with 4 right-endpoint rectangles.

02 Use 4 left-endpoint rectangles for the same integral.

03 Which of those is an overestimate, and why?

04 Write a right-endpoint Riemann sum for the integral of x^2 on [0,2] with n equal subintervals.

Worked answers | Lesson 296

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Practice focus: Riemann sums

Original extra practice matched to the listed lesson topic.

01 Approximate the integral of x^2 on [0,2] with 4 right-endpoint rectangles.

Width 1/2; right endpoints 0.5,1,1.5,2. Sum = (1/2)(0.25+1+2.25+4)=3.75.

02 Use 4 left-endpoint rectangles for the same integral.

Endpoints 0,0.5,1,1.5. Sum=(1/2)(0+0.25+1+2.25)=1.75.

03 Which of those is an overestimate, and why?

The right sum overestimates because x^2 increases on [0,2]. The left sum underestimates.

04 Write a right-endpoint Riemann sum for the integral of x^2 on [0,2] with n equal subintervals.

$\Delta x=2/n$, $x_i=2i/n$. Sum from i=1 to n of $(2i/n)^2(2/n)$. Its limit is the integral.