Kaplan Center

History:

The William and Elaine Kaplan Recreation Center is the central location of both women's and men's basketball games during the winter season. Opening in 1992, this gymnasium is home to a NCAA-regulation basketball and volleyball court, a weight room, an aerobic room, athletic training facilities, and classrooms. To find the area under the curve of the three point line on the basketball court Reimann Sum and Simpson's Rule can be used. The equations using left hand and right hand approximations when finding the area are listed below.

Problem:

Find the area under the curve of the three point line, using right hand and left hand approximations, and Simpson's Rule. Compare the answers and convert the answers to ft^2.

- Left Hand:

  $\Delta x\ [f(x_0)+f(x_1)+f(x_2)+\ldots.f(x_{n-1})]$

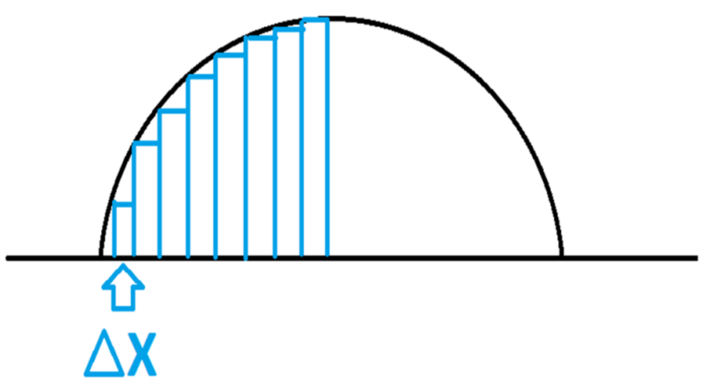
- Right Hand:

  $\Delta x\ [f(x_1)+f(x_2)+f(x_3)+\ldots.f(x_n)]$

- Simpson's Rule:

  $\Delta x/3\ [f(x_0)+4f(x_1)+2f(x_2)+4(fx_3)+2(fx_4)\ldots.f(x_n)]$

After using a tape measure to find the measurements of our rectangles and our delta x (Δx), we plugged the numbers into the appropriate equations to find our answers.



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Solutions:

In order to find the area under the curve of the three point line, find the delta x (Δx) and the measurements of the left hand and right hand endpoints. These numbers will help to fill in the equations to come to the correct conclusion. First measure the diameter of the three point line, which was 467.6 inches long, and find delta x (Δx) to be 33.4 inches. Then create a series of 14 rectangles underneath the curve and label left and right endpoints. Using measuring tape, measure the length of the rectangles from the line at the end of the court to where the endpoint was located on the three point line in inches. Do this for each rectangle and plug the numbers into the appropriate equations to find the answer.

Solution for Left Hand Summation (L_{13}):

$\Delta x\ [f(x_0)+f(x_1)+f(x_2)+\ldots f(x_{n-1})]$

L_{13}=33.4*(0in+185in+227.25in+257in+276.125in+288.75in+291.3in+298in+291.3in+288.75in+276.125in+257in+227.25in+185in)

L_{13}=111,851.59 in^2 or 766.75 ft^2

Solution for Right Hand Summation (R_{13}):

$\Delta x\ [f(x_1)+f(x_2)+f(x_3)+\ldots f(x_n)]$

R_{13}=33.4in*(185in+227.25in+257in+276.125in+288.75in+291.3in+298in+291.3in+288.75in+276.125in+257in+227.25in+185in+0in)

R_{13}=111,851.59 in^2 or 766.75 ft^2

Solution for Simpson's Rule (S_{13}):

$\Delta x/3\ [f(x_0)+4f(x_1)+2f(x_2)+4(fx_3)+2(fx_4)\ldots f(x_n)]$

S_{14}=(33.4in/3)*(0in+4(185in)+2(227.25in)+4(257in)+2(276.125in)+4(288.75in)+2(291.3in)+4(298in)+2(291.3in)+4(288.75in)+2(276.125in)+4(257in)+2(227.25in)+4(185in)+0in)

S_{14}=113,745.9267 in^2 or 789.90 ft^2