

Dominican Center



The Dominican Center holds a beautiful chapel. The smaller pews in the front face each other so that the people could sing face to face. The arches of the ceiling were designed so that voices would be echoed and microphones and speakers would not be needed.

Problem: (College)

1. The area occupied by one long pew in the Dominican Center chapel is represented by the region bounded by the function $f(x)=14$ and the x -axis between the interval $[0,122]$. In order to find the area of a single long pew, use integration to find the area between both curves.

2. If there is a total of twenty-two long pews in the chapel, what is the total area of all the long pews together?

3. The area of one small pew in The Motherhouse chapel is represented by the region bounded by the function $f(x)=16.5$ and the x -axis between the interval $[0, 23.5]$. In order to find the area of a single small pew, use integration to find the areas between both curves.

4. If there is a total of one hundred thirty-six small pews in the chapel, what is the total area of all the small pews together?

5. What is the total area of all the pews?



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Solutions:

· Formulas Needed:

$$A = \int_a^b f(x) - g(x) \, dx = \int_a^b \text{(upper-lower)} \, dx$$

$$F(b) - F(a)$$

· Use integration to find the area bounded between the curves. The upper function/f(x) is $y=14$. The lower function/g(x) is the x-axis which is equal to zero.

$$A = \int_0^{122} 14 \, dx \rightarrow 14x \Big|_0^{122}$$

Use $F(b) - F(a)$ to solve: $14(122) - 14(0) = 1,708$ squared inches

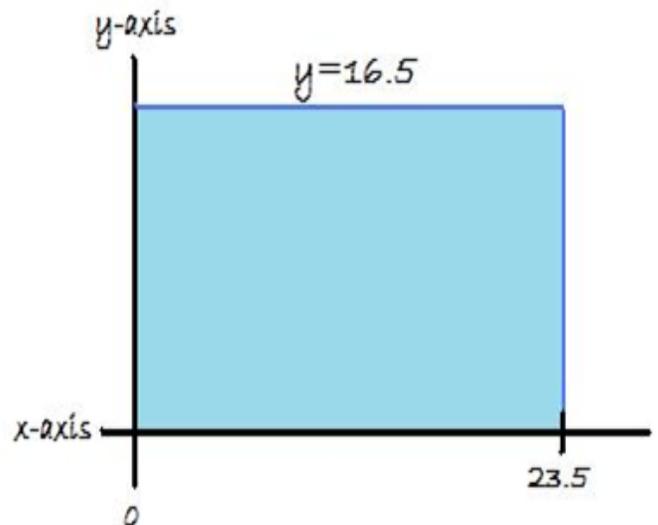
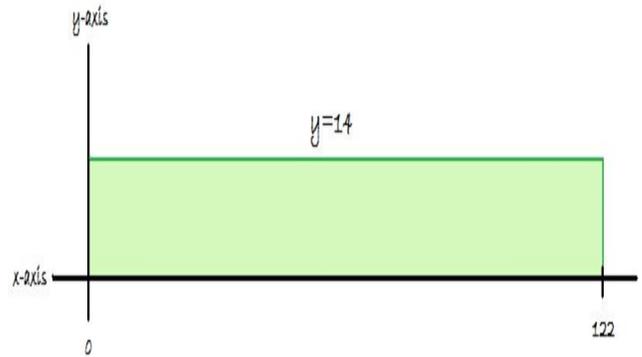
· Multiply the area of one long pew by the total number of pews.
 $1,708(22) = 37,576$ squared inches

Use integration to find the area bounded between the curves. The upper function/f(x) is equal to $y=16.5$. The lower function/g(x) is equal to the x-axis which is equal to zero.

$$A = \int_0^{23.5} 16.5 \, dx \rightarrow 16.5x \Big|_0^{23.5}$$

Use $F(b) - F(a)$ to solve: $16.5(23.5) - 16.5(0) = 387.75$ squared inches.

Multiply the area of one small pew by the total number of pews.
 $387.75(136) = 52,734$ squared inches



Easy estimate/check?