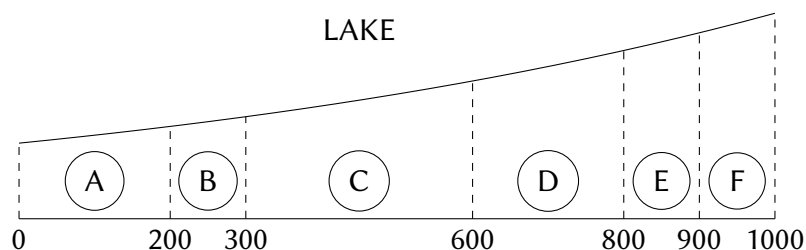


Math-71 Sections 9, 11, 12

Homework #11 Solutions

Problem

You work for the county tax collector's office. You prepare a platmap that shows six lakefront properties in your county as follows:



where the bottom boundary scale is in feet. The lakeshore follows the equation:

$$y = e^{\frac{x}{200}}$$

for x and y in feet.

The property tax assessment for these properties is to be \$2 per square foot.

What is the property tax assessment for property C?

First, find the area (in sq ft) under the curve:

$$\int_{300}^{600} e^{\frac{x}{200}} dx$$

We will solve this integral using substitution:

$$u = \frac{x}{200}$$

$$du = \frac{1}{200} dx$$

Next, compute the new limits:

$$u_1 = \frac{x_1}{200} = \frac{300}{200} = \frac{3}{2}$$

$$u_2 = \frac{x_2}{200} = \frac{600}{200} = 3$$

Next, adjust for the constant:

$$200 \int_{300}^{600} \frac{1}{200} e^{\frac{x}{200}} dx$$

Next, perform the substitution and evaluate the new integral:

$$200 \int_{\frac{3}{2}}^3 e^u du = 200 e^u \Big|_{\frac{3}{2}}^3 = 200 \left(e^3 - e^{\frac{3}{2}} \right) = 3120.77 \text{ ft}^2$$

Finally, multiply by the assessment per square foot to find the final answer:

$$3120.77 \text{ ft}^2 \cdot 2 \text{ \$/ft}^2 = \$6241.54$$

Therefore, the property tax assessment on parcel C is \$6241.54.