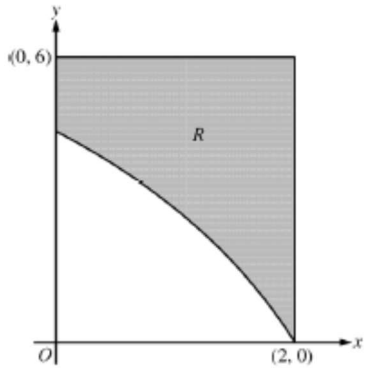
CALCULATOR PERMITTED
2010 AP© Calculus AB (Form B)
Question 1

In the figure, R is the shaded region in the first quadrant bounded by the graph of $y = 4\ln(3 - x)$, the horizontal line $y = 6$, and the vertical line $x = 2$.



A) Find the area of R

$$\text{Area} = \int_0^2 [6 - 4\ln(3-x)]\,dx$$

$$\text{Area} = 6.817$$

B) Find the volume of the solid generated when R is revolved about the horizontal line y = 8.

$$V = \pi \int_0^2 [(8 - 4\ln(3-x))^2 - (8-6)^2]\,dx$$

$$= 53.533\pi$$

$$= 168.179$$

C) The region R is the base of a solid. For this solid, each cross section perpendicular to the x-axis is a square. Find the volume of the solid.

$$V = \int_0^2 [6 - 4\ln(3-x)]^2\,dx$$

$$V = 26.267$$