

AP[®] CALCULUS AB
2004 SCORING GUIDELINES (Form B)

Question 1

Let R be the region enclosed by the graph of $y = \sqrt{x-1}$, the vertical line $x = 10$, and the x -axis.

- (a) Find the area of R .
 (b) Find the volume of the solid generated when R is revolved about the horizontal line $y = 3$.
 (c) Find the volume of the solid generated when R is revolved about the vertical line $x = 10$.

(a) Area = $\int_1^{10} \sqrt{x-1} \, dx = 18$

3 : $\left\{ \begin{array}{l} 1 : \text{limits} \\ 1 : \text{integrand} \\ 1 : \text{answer} \end{array} \right.$

(b) Volume = $\pi \int_1^{10} (9 - (3 - \sqrt{x-1})^2) \, dx$
 = 212.057 or 212.058

3 : $\left\{ \begin{array}{l} 1 : \text{limits and constant} \\ 1 : \text{integrand} \\ 1 : \text{answer} \end{array} \right.$

(c) Volume = $\pi \int_0^3 (10 - (y^2 + 1))^2 \, dy$
 = 407.150

3 : $\left\{ \begin{array}{l} 1 : \text{limits and constant} \\ 1 : \text{integrand} \\ 1 : \text{answer} \end{array} \right.$