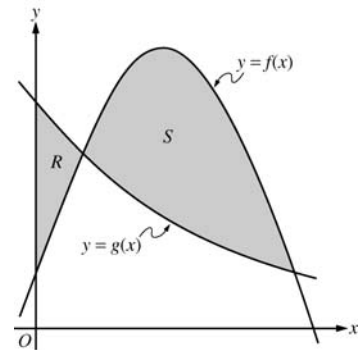


**AP[®] CALCULUS AB
2005 SCORING GUIDELINES**

Question 1

Let f and g be the functions given by $f(x) = \frac{1}{4} + \sin(\pi x)$ and $g(x) = 4^{-x}$. Let R be the shaded region in the first quadrant enclosed by the y -axis and the graphs of f and g , and let S be the shaded region in the first quadrant enclosed by the graphs of f and g , as shown in the figure above.



- (a) Find the area of R .
 (b) Find the area of S .
 (c) Find the volume of the solid generated when S is revolved about the horizontal line $y = -1$.

$$f(x) = g(x) \text{ when } \frac{1}{4} + \sin(\pi x) = 4^{-x}.$$

f and g intersect when $x = 0.178218$ and when $x = 1$.
 Let $a = 0.178218$.

(a) $\int_0^a (g(x) - f(x)) dx = 0.064$ or 0.065

3 : $\begin{cases} 1 : \text{limits} \\ 1 : \text{integrand} \\ 1 : \text{answer} \end{cases}$

(b) $\int_a^1 (f(x) - g(x)) dx = 0.410$

3 : $\begin{cases} 1 : \text{limits} \\ 1 : \text{integrand} \\ 1 : \text{answer} \end{cases}$

(c) $\pi \int_a^1 ((f(x) + 1)^2 - (g(x) + 1)^2) dx = 4.558$ or 4.559

3 : $\begin{cases} 2 : \text{integrand} \\ 1 : \text{limits, constant, and answer} \end{cases}$