Let R be the region enclosed by the graph of $f(x) = x^4 - 2.3x^3 + 4$ and the horizontal line $y = 4$, as shown in the figure.

(2.3, 4)

R

$x = k$
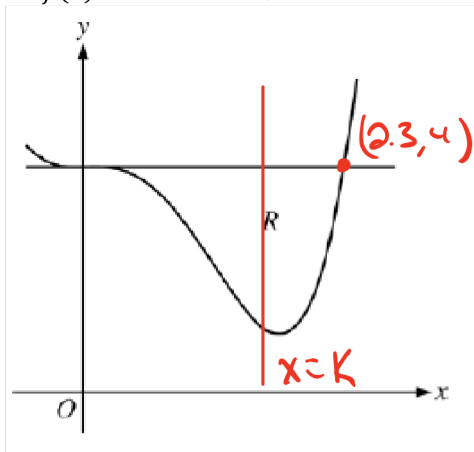
A) Find the volume of the solid generated when R is rotated about the horizontal line $y = -2$.

$$V = \pi \int_0^{2.3} \left[(4+2)^2 - (f(x)+2)^2 \right] dx \quad +2$$

$$= 98.868 \quad +1$$

B) Region R is the base of a solid. For this solid, each cross section perpendicular to the x-axis is an isosceles right triangle with a leg in R. Find the volume of the solid.

$$A = \frac{1}{2} \int_0^{2.3} \left[4 - f(x) \right]^2 dx \quad +2$$

$$A = 3.574 \quad +1$$

C) The vertical line $x = k$ divides R into two regions with equal areas. Write, but do not solve, an equation involving integral expressions whose solution give the value of k.

$$\int_0^k \left[4 - f(x) \right] dx = \int_k^{2.3} \left[4 - f(x) \right] dx \quad +2$$

or

$$\int_0^k \left[4 - f(x) \right] dx = \frac{1}{2} \left(3.574 \right)$$