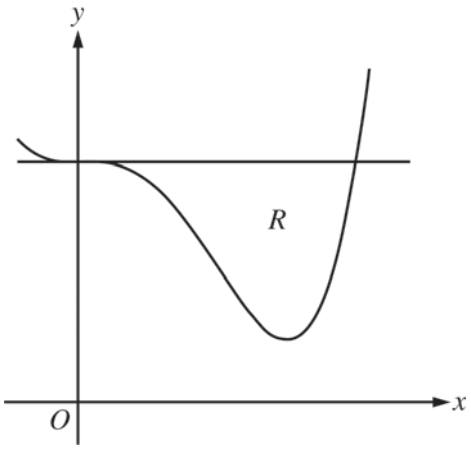
2014 AB #2
(calculator active)



R is the region bounded from above by the horizontal line $y = 4$ and the curve $f(x) = x^4 - 2.3x^3 + 4$

(a) The curves intersect when $f(x) = 4 \Rightarrow$ Solve using your calculator: $x = 0$ and 2.3
The volume of the solid if R is rotated about the line $y = -2$ is
$\pi\int_0^{2.3}\left((4-(-2))^2-\left(f(x)-(-2)\right)^2\right)dx \approx 98.86788997$ $\boxed{98.868}$

(b) The volume is $\int_0^{2.3}$(Area of each cross section) dx
Since each cross section is an isosceles right triangle with one of the legs in R, then the legs are both the base and height of the triangle $\Rightarrow$
the area of each cross section is $\frac{1}{2}(leg)^2 = \frac{1}{2}\left(4-f(x)\right)^2$.
Hence, the Volume $= \int_0^{2.3}\frac{1}{2}\left(4-f(x)\right)^2 dx \approx 3.573715598$ $\boxed{3.574}$

(c) The area from 0 to k = the area from k to 2.3 $\Rightarrow$ $\boxed{\int_0^k\left(4-f(x)\right)dx = \int_k^{2.3}\left(4-f(x)\right)dx}$