Volume of Solid of Revolution

a review

6. Let R be the region in the first quadrant enclosed by $y = x^2$, $y = 2 + x$, and $x = 0$. In each part, set up, but *do not evaluate*, an integral or a sum of integrals that will solve the problem.

(a) Find the area of R by integrating with respect to x.

(b) Find the area of R by integrating with respect to y.

(c) Find the volume of the solid generated by revolving R about the x-axis by integrating with respect to x.

(d) Find the volume of the solid generated by revolving R about the x-axis by integrating with respect to y.

(e) Find the volume of the solid generated by revolving R about the y-axis by integrating with respect to x.

(f) Find the volume of the solid generated by revolving R about the y-axis by integrating with respect to y.

(g) Find the volume of the solid generated by revolving R about the line $y = -3$ by integrating with respect to x.

(h) Find the volume of the solid generated by revolving R about the line $x = 5$ by integrating with respect to x.

6. (a) $A = \int_0^2 (2 + x - x^2)\, dx$

(b) $A = \int_0^2 \sqrt{y}\, dy + \int_2^4 [(\sqrt{y} - (y-2)]\, dy$

(c) $V = \pi \int_0^2 [(2+x)^2 - x^4]\, dx$

(d) $V = 2\pi \int_0^2 y\sqrt{y}\, dy + 2\pi \int_2^4 y[\sqrt{y} - (y-2)]\, dy$

(e) $V = 2\pi \int_0^2 x(2 + x - x^2)\, dx$

(f) $V = \pi \int_0^2 y\, dy + \int_2^4 \pi(y - (y-2)^2)\, dy$

(g) $V = \pi \int_0^2 [(2+x+3)^2 - (x^2+3)^2]\, dx$

(h) $V = 2\pi \int_0^2 [2 + x - x^2](5 - x)\, dx$