1–3 Set up an integral that represents the volume by revolving the area around the $x-axis.$

1. $y = x^2, y = 0, x = 1$ [Ans. $\int_0^1 \pi x^4 dx = \frac{1}{5}\pi$]
2. $y = \sqrt{4-x}, y = 0, x = 0$ [Ans.$\int_0^4 \pi(4-x)dx = 8\pi$]$y = \frac{1}{x}, x = 1, x = 2, y = 0$
3. $y = x^2 - x, y = 0$ [Ans. Notice that the graph is below $x - axis,$ so the volume is $\int_0^1 \pi(-x^2+x)^2 dx$].

4–7 Set up an integral that represents the volume by revolving the area around the $y - axis.$

4. $y = 1 - x, x = 0, y = 0$ [$\int_0^1 \pi(1-y)^2 dy$]
5. $y = x^2, x = y^2$ [$\int_0^1 \pi\left(\left(\sqrt{y}\right)^2 - (y^2)^2\right)dy$]
6. $y = \sqrt{9-x}, x = 0, y = 0$ [$\int_0^3 \pi(9-y^2)^2 dy$]
7. $y = 9 - x^2, y = 0, 0 \le x \le 3$ [$\int_0^9 \pi\left(\sqrt{9-y}\right)^2 dy$]

8–12 Find the volume of the solid generated by rotating the region bounded by the given curves about the given line.

8. $y = x^2, x = y^2$ about the line $y = 2$ [$\int_0^1 \pi\left((2-x^2)^2 - (2-\sqrt{x})^2\right)dx$]
9. $y = x^2, x = y^2$ about the line $x = -1$ [$\int_0^1 \pi\left(\left(\sqrt{y}+1\right)^2 - (y^2+1)^2\right)dy$]
10. $y = x, y = \sqrt{x}$ about the line $y = -1$ [$\int_0^1 \pi\left((\sqrt{x}+1)^2 - (x+1)^2\right)dx$]
11. $y = x, y = \sqrt{x}$ about the line $x = 2$ [$\int_0^1 \pi\left((2-y^2)^2 - (2-y)^2\right)dy$]
12. $y = x^{2/3}, x = 1, y = 0$ about the y-axis [$\int_0^1 (1^2 - (y^{3/2})^2)dy$].

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