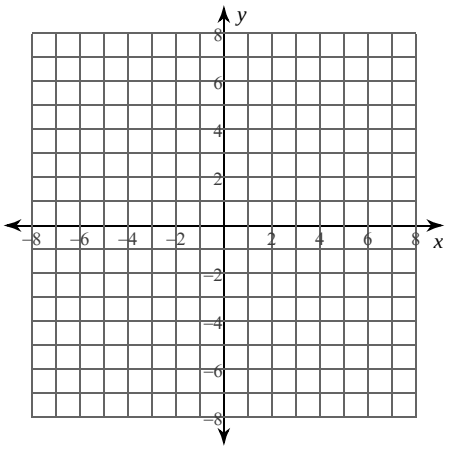
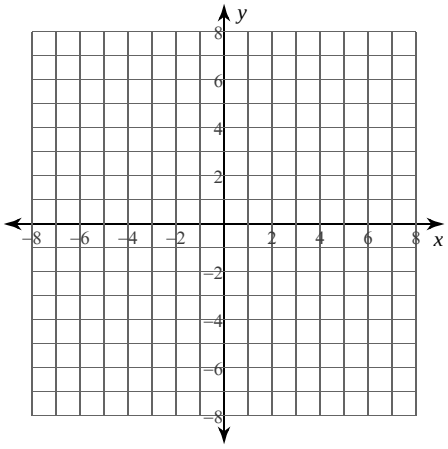
Calculus Practice: Using Definite Integrals to Calculate Volume 6b

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the *y*-axis. You may use the provided graph to sketch the curves and shade the enclosed region.

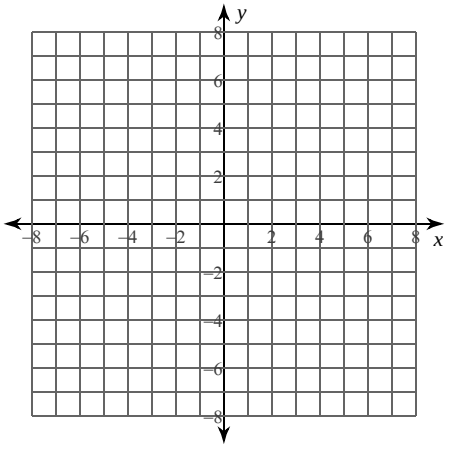
1) $x = 3,\ x = \frac{1}{y},\ y = 2$



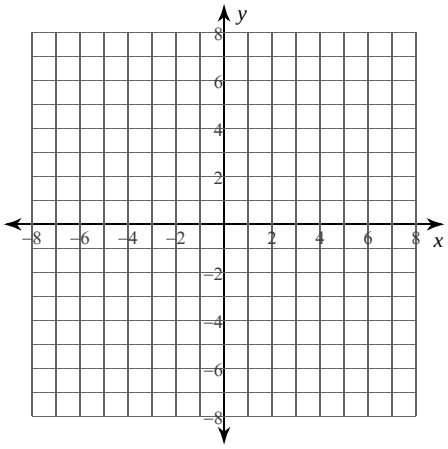
2) $x = -y^2 + 4,\ x = y + 2,\ y = -1,\ y = 0$



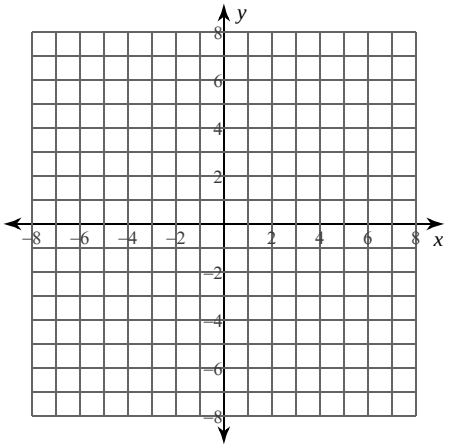
3) $x = \sqrt{y},\ x = \frac{y}{2}$



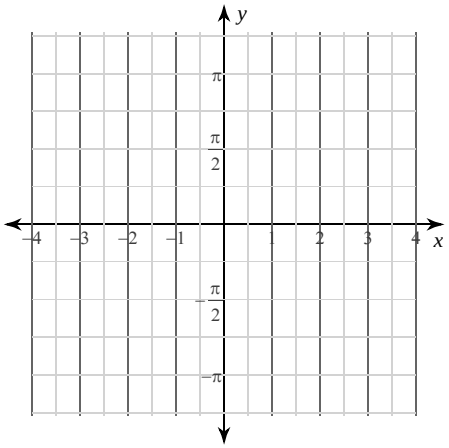
4) $x = -y^2 + 6,\ x = 2,\ y = 0,\ y = 2$



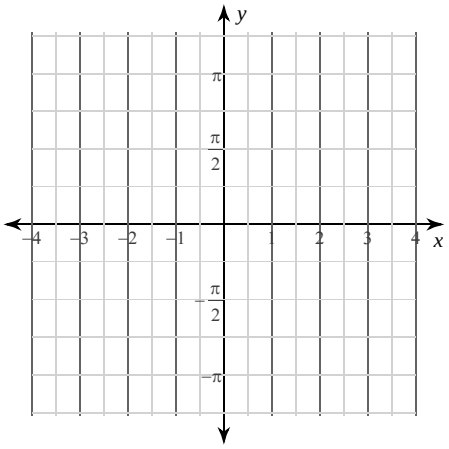
5) $x = -y^2 + 2,\ x = 1$



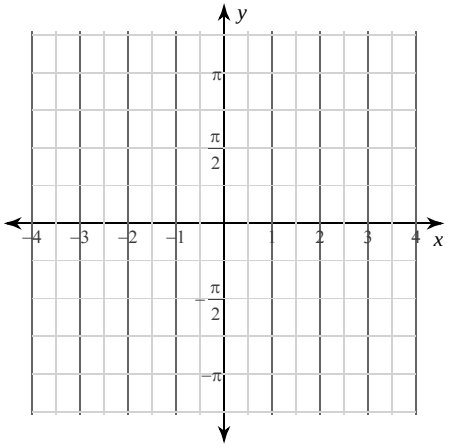
6) $x = 2\csc y,\ x = \csc y,\ y = \frac{\pi}{4},\ y = \frac{\pi}{2}$



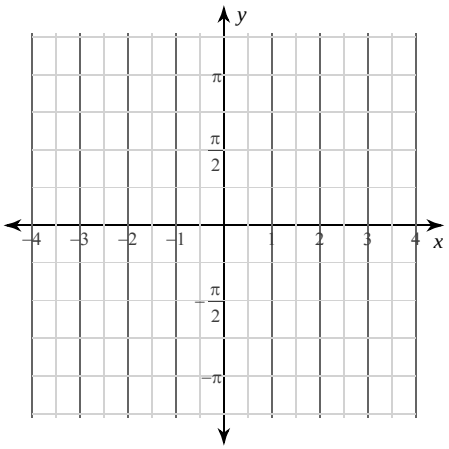
7) $x = 2\csc y,\ x = \csc y,\ y = \frac{\pi}{4},\ y = \frac{3\pi}{4}$



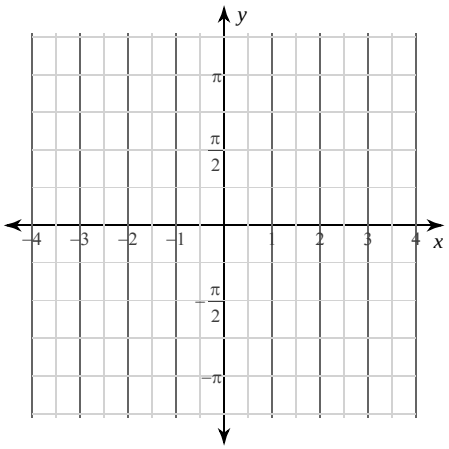
8) $x = 2\sqrt{\cos y},\ x = \sqrt{\cos y},\ y = -\frac{\pi}{2},\ y = \frac{\pi}{2}$



9) $x = 2\sec y,\ x = \sec y,\ y = -\frac{\pi}{6},\ y = \frac{\pi}{3}$



10) $x = 2,\ x = \sqrt{\cos y},\ y = -\frac{\pi}{2},\ y = \frac{\pi}{2}$



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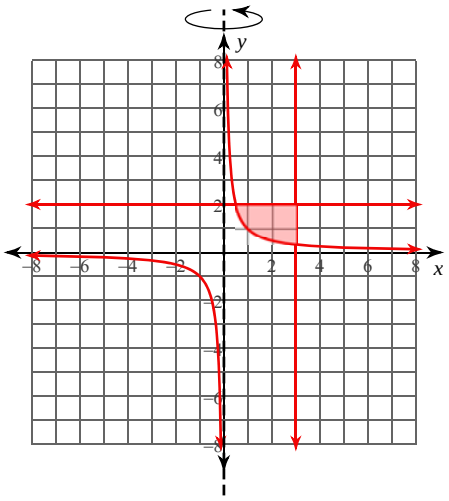
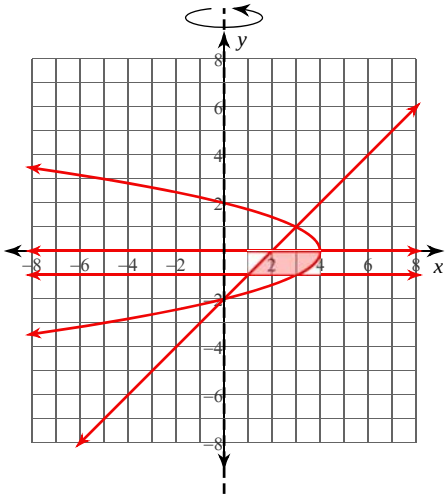


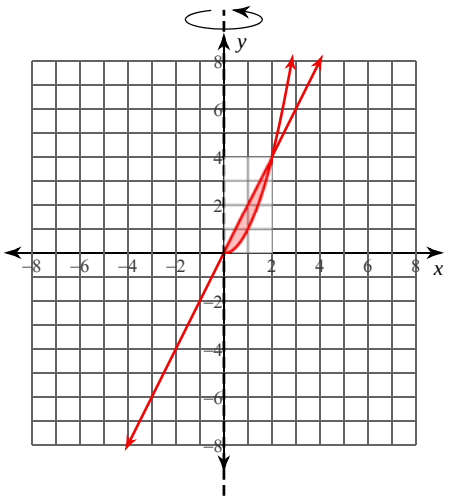
$\frac{25}{2}\pi \approx 39.27$

2) $x = -y^2 + 4,\ x = y + 2,\ y = -1,\ y = 0$



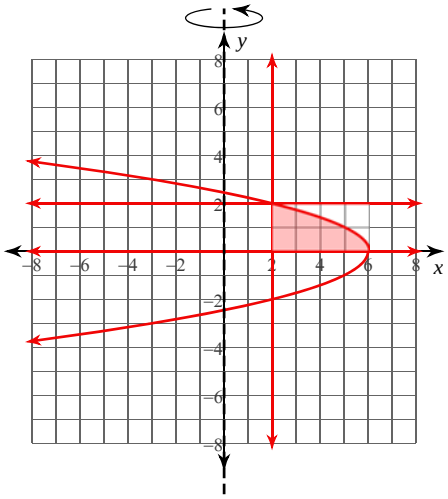
$\frac{56}{5}\pi \approx 35.186$

3) $x = \sqrt{y},\ x = \frac{y}{2}$



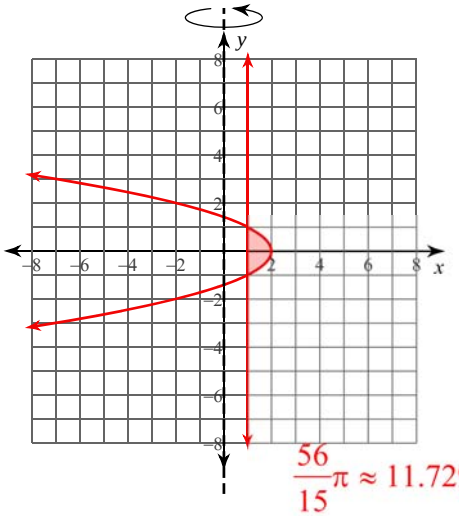
$\frac{8}{3}\pi \approx 8.378$

4) $x = -y^2 + 6,\ x = 2,\ y = 0,\ y = 2$



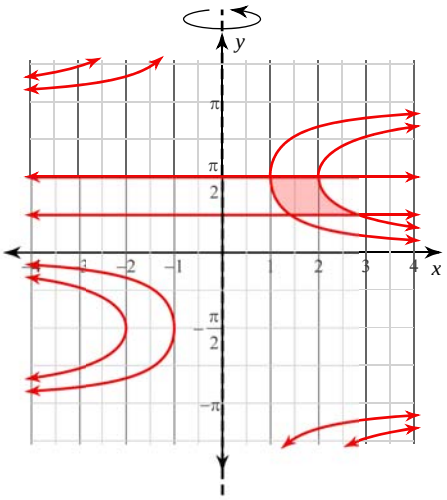
$\frac{192}{5}\pi \approx 120.637$

5) $x = -y^2 + 2,\ x = 1$



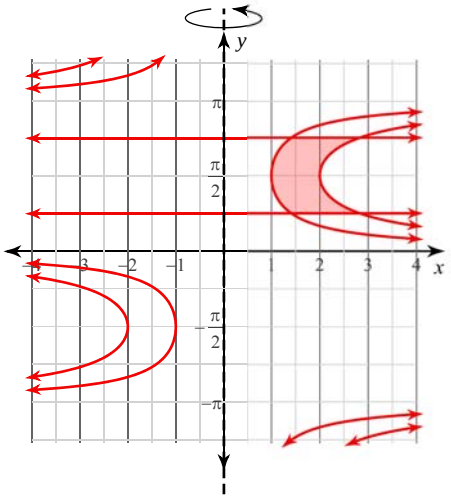
$\frac{56}{15}\pi \approx 11.729$

6) $x = 2\csc y,\ x = \csc y,\ y = \frac{\pi}{4},\ y = \frac{\pi}{2}$



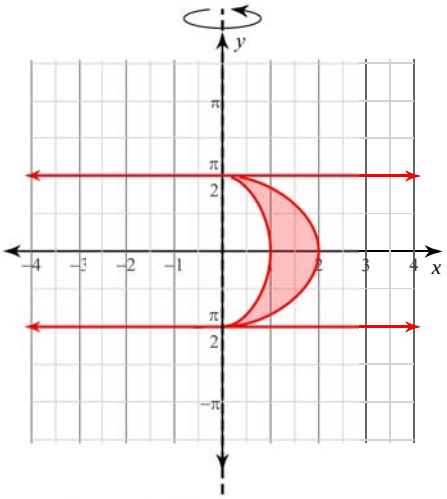
$3\pi \approx 9.425$

7) $x = 2\csc y,\ x = \csc y,\ y = \frac{\pi}{4},\ y = \frac{3\pi}{4}$



$6\pi \approx 18.85$

8) $x = 2\sqrt{\cos y},\ x = \sqrt{\cos y},\ y = -\frac{\pi}{2},\ y = \frac{\pi}{2}$



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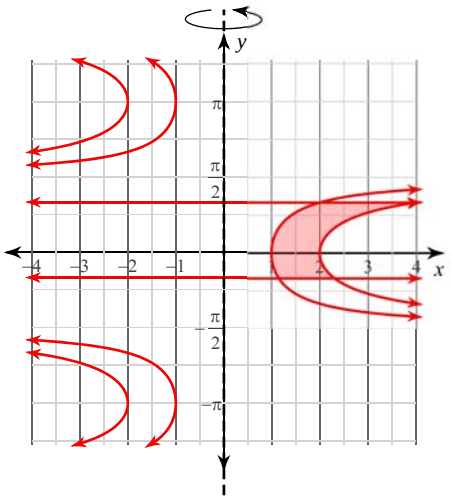
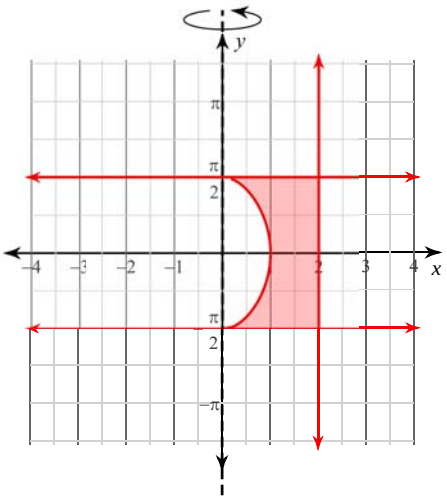


$4\sqrt{3} \cdot \pi \approx 21.766$

10) $x = 2,\ x = \sqrt{\cos y},\ y = -\frac{\pi}{2},\ y = \frac{\pi}{2}$



$(4\pi - 2)\pi \approx 33.195$