Lesson 14

Set up the integrals used to find the volume obtained by rotating the given region about the given axis.

1. $y = x$, $y = x^2$ about the line $x = -1$
   (*Answer:* $V = \pi \int_0^1 (1 + \sqrt{y})^2 - (1 + y)^2 dy = \frac{\pi}{2}$)

2. $y = e^x + e^{-x}$, $x = 0$, $x = 7$, $y = 0$ about the $x-$axis
   (*Answer:* $V = \pi \int_0^7 (e^x + e^{-x})^2 dx \approx 1248.6$)

3. $y = x$, $y = \sqrt{x}$ about the line $y = 1$
   (*Answer:* $V = \pi \int_0^1 (1 - x)^2 - (1 - \sqrt{x})^2 dx = \frac{\pi}{6}$)

4. $x = y^2$, $x = 1$ about the line $x = 1$
   (*Answer:* $V = \pi \int_{-1}^1 (1 - y^2)^2 dy = \frac{16\pi}{15}$)

5. $y = x^2$, $x = y^2$ about the line $x = -1$
   (*Answer:* $V = \pi \int_0^1 (1 - \sqrt{y})^2 - (1 + y^2)^2 dy = \frac{29\pi}{30}$)

6. $y = \frac{2}{x}$, $y = 0$, $x = 1$, $x = 10$ about the line $y = 3$
   (*Answer:* $V = \pi \int_1^{10} 3^2 - (3 - \frac{2}{x})^2 dx \approx 75.496$)