Topic 17: Exercises on Volumes and Shells
Level 2, Part 1

1. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \le x \le 1, x^3 \le y \le 1\}$ about the line $x = 1$.

$\frac{9\pi}{10}$ units^3

2. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \le x \le 1, x^3 \le y \le 1\}$ about the line $y = 1$.

$\frac{9\pi}{14}$ units^3

3. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \leq x \leq 1, x^{1/3} \leq y \leq 1\}$ about the y- axis.

$\frac{\pi}{7}$ units^3

4. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq x^2\}$ the line $y = 1$.

$\frac{7\pi}{15}$ units^3

5. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \leq x \leq 2, 4 - x^2 \leq y \leq 4\}$ about the x- axis.

$\frac{224\pi}{15}$ units^3

6. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 0 \le x \le 2, 4 - x^2 \le y \le 4\}$ the line $y = 4$.

$\frac{32\pi}{5}$ units^3

7. By taking strips parallel to the axis of rotation, use the method of cylindrical shells to find the volume of the solid obtained by rotating the region $\{(x, y) : 1 \leq x \leq e, 0 \leq y \leq \ln x\}$ about the x-axis.

$\pi(e-2)$ units^3