

1 PART I: Volumes by revolution, Cylindrical shells

1. The region bounded by $y = 10 - 3x^2$, $x = 0$, $y = 0$ and $x = 1$ is revolved about the following axes. In each case, set up an integral for the volume of the resulting object and calculate the volume using BOTH cylindrical shells and washer.

a) $x = 2$

b) $y = -5$

2. The region bounded by $y = 3x - 2$, $y = \sqrt{x}$ and $y = 0$ is revolved about the following axes. In each case, set up an integral for the volume of the resulting object and calculate the volume using BOTH cylindrical shells and washer.

a) $x = 0$

b) $y = 0$

c) $y = 10$

d) $x = -1$

2 PART II: Arc Length and Surface area

3. Find the length of the segment of the curve $y = 1 + 5x^{3/2}$ from $x = 0$ to $x = 4$.

4. Find the length of the segment of the curve $x = \frac{1}{6}(e^{3y} + e^{-3y})$ from $y = 0$ to $y = 1$.

5. Find the area of the surface generated when the given curve is revolve about the given axis.

a) $y = 4x^3$ from $x = 0$ to $x = 1$ about the x axis

b) $x = \sqrt{2y+1}$ from $x = 1$ to $x = 3$ about the y axis.

c) $x = \sqrt{12y - y^2}$ from $y = 1$ to $y = 4$ about the y axis.