**Topic 22: Volume**

Compute the volume of the solid formed by revolving the given region about the given line.

1. Region bounded by \( y = \sqrt{x} \) on the interval \([0,4]\) about the x-axis.

2. Region bounded by \( y = 2 - \frac{1}{2}x^2 \) from \(x=0\) to \(x=2\) about the y-axis.

3. Region bounded by \( y = x^2, \ x = 0, \) and \( y = 1 \) about (a) the y-axis, (b) the x-axis, (c) line \( y=2 \).

4. Region bounded by \( y = 4 - x^2 \) and \( y = 0 \) about (a) the y-axis, (b) the line \( y= -3 \), (c) the line \( y=7 \), (d) the line \( x=3 \).

5. Region bounded by \( y = x \) and \( y = x^2 \) in the first quadrant revolved about the y-axis.

6. Region bounded by the graphs of \( y = 4 - x^2 \) and the x-axis about the line \( x=3 \).

7. Region bounded by the graphs of \( y = x, \ y = 2 - x, \ y = 0 \) and revolved about (a) the line \( y=2 \), (b) the line \( y= -1 \), (c) the line \( x=3 \).

**Answers**

1) \( 8\pi \)

2) \( 4\pi \)

3) (a) \( \frac{\pi}{2} \) (b) \( \frac{4}{5}\pi \) (c) \( \frac{28}{15}\pi \)

4) (a) \( 8\pi \) (b) \( \frac{1472}{15}\pi \) (c) \( \frac{576}{5}\pi \) (d) \( 64\pi \)

5) \( \frac{\pi}{6} \)

6) \( 64\pi \)

7) (a) \( \frac{10}{3}\pi \) (b) \( \frac{8}{3}\pi \) (c) \( 4\pi \)