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) 8π

2) 4π

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) 64π

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