Volumes: Cylindrical Shells- HW Problems

Use the method of cylindrical shells to find the volume of the solid obtained by rotating the region bounded by the curves about the given line.

1. $y = x - x^3,\ \ y = 0,\ \ 0 \le x \le 1,$ about the y-axis
2. $y = x^3,\ \ y = 1,\ \ x = 0,$ about the x-axis.
3. $y = x^2 + 2,\ \ y = 0,\ \ x = 0,\ \ x = 2$ about the y-axis.
4. $y = x^2,\ \ y = x,$ about the x-axis
5. $y = x^3,\ \ y = 1,\ \ x = 0,$ about the line $y = 3$
6. $y = x^2,\ \ y = 8 - x^2,$ about the line $x = 2$
7. $y = \sqrt{9 - x},\ \ x = 0,\ \ y = 0,$ about the line $y = -2$
8. $y = 4x - x^2,\ \ y = 3,$ about the line $x = 1.$