

1. Determine the volume of a shape whose base is bounded by $y = x + 2$, $y = 0$ & $x = 2$ and whose cross-sections perpendicular to the x -axis are:
 - a) squares
 - b) rectangles of height 4
 - c) semi-circles
2. Determine the volume of a shape whose base is bounded by $y = 4x - x^2$ & $y = 0$, and whose cross-sections perpendicular to the x -axis are:
 - a) squares
 - b) rectangles of height 2
 - c) semi-circles
3. Determine the volume of a shape whose base is bounded by $y = 2x$ & $y = x^2$, and whose cross-sections perpendicular to the x -axis are:
 - a) squares
 - b) rectangles of height 3
 - c) semi-circles
4. Determine the volume of a shape whose base is bounded by $x^2 + y^2 = 4$, and whose cross-sections perpendicular to the x -axis are:
 - a) squares
 - b) rectangles of height 5
 - c) semi-circles

KEY

1. a) $\int_{-2}^2 (x+2)^2 dx = \frac{64}{3}un^3$
b) $4\int_{-2}^2 (x+2)dx = 32un^3$
c) $\frac{\pi}{8}\int_{-2}^2 (x+2)^2 dx = \frac{8\pi}{3}un^3$
2. a) $\int_0^4 (4x-x^2)^2 dx = \frac{512}{15}un^3$
b) $2\int_0^4 (4x-x^2)dx = \frac{64}{3}un^2$
c) $\frac{\pi}{8}\int_0^4 (4x-x^2)^2 dx = \frac{64\pi}{15}un^3$
3. a) $\int_0^2 (2x-x^2)^2 dx = \frac{16}{15}un^3$
b) $3\int_0^2 (2x-x^2)dx = 4un^2$
c) $\frac{\pi}{8}\int_0^2 (2x-x^2)^2 dx = \frac{2\pi}{15}un^3$
4. a) $4\int_{-2}^2 (4-x^2)dx$ or $8\int_0^2 (4-x^2)dx = \frac{128}{3}un^2$
b) $10\int_{-2}^2 (\sqrt{4-x^2})dx$ or $20\int_0^2 (\sqrt{4-x^2})dx = 62.8un^2$
c) $\frac{\pi}{2}\int_{-2}^2 (4-x^2)dx$ or $\pi\int_0^2 (4-x^2)dx = \frac{16\pi}{3}un^3$