

More problems for section 6.2 of *Calculus, Early Transcendentals* by James Stewart, 8e.

1. Find the volume of the solid whose intersection with the xy -plane is the region R bounded by {the given curves} and whose cross-sections perpendicular to [the given axis] are as described.

(The last few problems might require some techniques of integration from Chapter 7. Use the table of integrals in your text if we've not covered that chapter yet.)

- a. $\{y = \sqrt{16 - x^2}, y=0\}$, [the x -axis], squares with one side in R .
- b. $\{y = \sqrt{16 - x^2}, y=0\}$, [the x -axis], squares with one diagonal in R .
- c. $\{y = \sqrt{16 - x^2}, y=0\}$, [the y -axis], squares with one side in R .
- d. $\{y = 2\sqrt{x}, x = 0, y = 2\}$, [the x -axis], squares with one side in R .
- e. $\{y = 2\sqrt{x}, x = 4, y = 0\}$, [the x -axis], equilateral triangles with one side in R .
- f. $\{y = 2\sqrt{x}, x = 4, y = 0\}$, [the y -axis], squares with one side in R .
- g. $\{y = x, y = x^3\}$, [the y -axis], squares with one side in R .
- h. $\{y = x, y = x^3\}$, [the x -axis], squares with one side in R .
- i. $\{y = x, y = x^3\}$, [the x -axis], circles with a diameter in R .
- j. $\{y = x, y = x^3\}$, [the x -axis], equilateral triangles with one side in R .
- k. $\{y = \frac{1}{4}x^2, y = 5 - x^2\}$, [the x -axis], squares with one side in R .
- l. $\{y = \frac{1}{4}x^2, y = 0, x = 2\}$, [the x -axis], squares with one side in R .
- m. $\{y = \frac{1}{4}x^2, y = 0, x = 2\}$, [the y -axis], squares with one side in R .
- n. $\{y = \frac{1}{4}x^2, y = 0, x = 2\}$, [the y -axis], circles with a diameter in R .
- o. $\{xy = 1, y = 1, y = 2, x = 0\}$, [the y -axis], squares with one side in R .
- p. $\{xy = 1, y = 1, y = 2, x = 0\}$, [the y -axis], circles with a diameter in R .
- q. $\{xy = 1, y = 1, y = 2, x = 0\}$, [the y -axis], equilateral triangles with one side in R .
- r. $\{y = 2, x = 0, y = e^x\}$, [the x -axis], squares with one side in R .
- s. $\{y = 2, x = 0, y = e^x\}$, [the y -axis], squares with one side in R .
- t. $\{y = e^x, y = e^{-x}, x = 1\}$, [the x -axis], squares with one side in R .
- u. $\{y = \sin x, y = \cos x, x = \pi/4, x = 5\pi/4\}$, [the x -axis], squares with one side in R .
- v. $\{y = \sin x, y = 0, x = 0, x = \pi\}$, [the x -axis], squares with one side in R .
- w. $\{y = e^x, y = -x, x = 0, x = 2\}$, [the x -axis], squares with one side in R .

Answers

- 1a. $2^8/3$ (or $256/3$) 1b. $2^7/3$ (or $128/3$) 1c. $2^9/3$ (or $512/3$) 1d. $2/3$ 1e. $8\sqrt{3}$ 1f. $512/15$ 1g. $16/105$ 1h. $16/105$
 1i. $16\pi/420$ 1j. $16\sqrt{3}/420$ 1k. $160/3$ 1l. $2/5$ 1m. $2/3$ 1n. $2\pi/12$ 1o. $1/2$ 1p. $\frac{\pi}{8}$ 1q. $\frac{\sqrt{3}}{8}$ 1r. $\ln 16 - 5/2$ 1s. $2(1 - \ln 2)^2$
 1t. $\sinh 2 - 2$ 1u. π 1v. $\pi/2$ 1w. $\frac{25}{6} + 2e^2 + \frac{e^4}{4}$