

Problem Set 4

1) Consider the region \mathcal{D} bounded by the graphs of $y = \frac{x^2}{2}$ and $y = x + 4$. Construct the definite integral that represents the volume of the corresponding solid of revolution obtained by revolving the region \mathcal{D} about...

(a) the x -axis.

(b) the line $x = -4$.

(c) the line $x = 4$.

(d) the line $y = 8$.

For practice, try evaluating each definite integral!

2) Construct volume integrals via the (i) washer method and (ii) shell method for the following regions revolved about their specified axes. Compute the volume whenever possible.

(a) The solid obtained by revolving the triangular region bounded by the lines $y = 1 - x$, $y = 2x - 2$, and $y = 1 + x$ about the x -axis.

(b) The solid obtained by revolving the triangular region bounded by the lines $y = 1 - x$, $y = 2x - 2$, and $y = 1 + x$ about the y -axis.

(c) The solid obtained by revolving the region between the curve $y = \sin x$ and the x -axis over the interval $[0, 2\pi]$ about the x -axis.

(d) The solid obtained by revolving the region between the curve $y = \sin x$ and the x -axis over the interval $[0, 2\pi]$ about the y -axis.