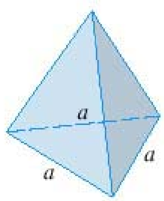
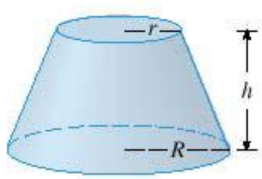
Volume of revolution – Slicing

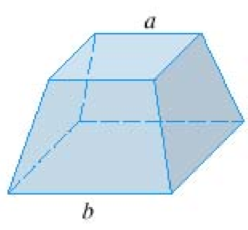
1. Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis: $y = 2x,\ y = x^2;\ \textit{about the } x-\textit{axis}$
2. Find the volume of the solid obtained by rotating the region bounded by $y = \sqrt[4]{x}$ and $y = x$ about the line $y = 1$.
3. Find the volume of the solid obtained by rotating the region bounded by $y = x^5$ and $x = y^5$ about the line $x = -1$.
4. Find the volume of a right circular cone with height h = 48 and base radius r = 4.
5. Find the volume of a pyramid with height h = 27 and rectangular base with dimensions 10 and 20.
6. Find the volume of a pyramid with height 5 and base an equilateral triangle with side a = 4.



7. The volume of the frustum of a right circular cone with height h = 9, lower base radius R = 10 and top radius r = 2 is 372π.



8. Find the volume of the frustum of a pyramid with square base of side b = 12, square top of side a = 2, and height h = 3.



Volume of revolution - Shells

1. Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the given curves about the specified axis:
   $y = x^2, \; y = 0, \; x = 1, \; x = 6; \; about \; x = 1$
2. Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis.
   $y = \sin x, \; y = 0, \; x = 2\pi, \; x = 8\pi; \; about \; the \; y - axis$
3. Use the method of cylindrical shells to find the volume of solid obtained by rotating the region bounded by the given curves about the x – axis:
   $y^2 - 3y + x = 0, \quad x = 0$
4. Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the given curves about the specified axis:
   $y = x^2, \; y = 0, \; x = 1, \; x = 4 \; ; \; about \; x = 1$
5. Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the given curves about the y-axis: $y = \frac{1}{x}$, $y = 0$, $x = 1$, $x = 9$

Arc length

1. Set up, but do not evaluate, an integral for the length of the curve:
   $y = e^x \sin x, \; 0 \le x \le \pi / 2$
2. Find the length of the curve for the interval $a \le v \le b$: $y = \ln\left(\frac{e^v + 1}{e^v - 1}\right)$
3. Find the length of the curve: $y = \frac{1}{6}(x^2 + 4)^{3/2}, \; 0 \le x \le 2$
4. Find the length of the curve: $x = \frac{y^4}{8} + \frac{1}{4y^2}, \; 1 \le y \le 2$