1. Find the area of the region between $y = x^2$ and $y = x + 2$ from $x = 0$ to $x = 1$. 
2. Find the area of the region bounded by the line \( y = x \) and the parabola \( y = 6 - x^2 \).
3. Find the area of the region bounded by $y = x^3$ and $y = x$. 
4. Find the area of the region between $x = y^2$ and $x = 32 - y^2$ from $y = -2$ to $y = 2$. 
5. Find the area of the region between lines \( x = -2y + 5 \), \( x = y - 1 \) and \( y = 0 \).
6. Find the area of the region between $x = -y^2$ and $x = y - 2$. 
7. The base of a certain solid is a circle with diameter $AB$ of length $2a$. Find the volume of the solid if each cross section perpendicular to $AB$ is a square.
8. The base of a certain solid is the region in the $xy$–plane bounded by the parabolas $y = x^2$ and $x = y^2$. Find the volume of this solid if every cross section perpendicular to the $x$–axis is a square with base in the $xy$–plane.
9. Find the volume of a frustum of a pyramid with square base of side $b$, square top of side $a$ and height $h$. 
10. Find the volume of the solid which is generated by rotating the region bounded by $y = \sin x$ on $[0, \pi]$ and $y = 0$ about the $x$–axis.
11. Verify the formula $V = \frac{1}{3} \pi r^2 h$ for the volume of the circular cone with base radius $r$ and height $h$. 
12. Find the volume of the solid generated by rotating the region bounded by \( y = 1 - x^2 \),
lines \( x = -1 \) and \( x = 1 \) about the line \( y = 2 \).
13. Determine the volume of the solid obtained by rotating the region bounded by $x = 5 - x^2$ and $x = 1$ about the $y$-axis.