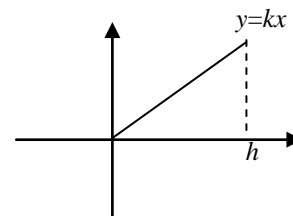


Section 1: Volumes of revolution

Exercise level 2

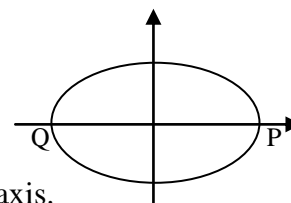
1. Find the volume of revolution produced when the curve $y = \sqrt{x-1}$ between $y = 1$ and $y = 2$ is rotated through 360° about the y -axis.

2. Find the volume of the solid generated by rotating the straight line $y = kx$ between $x = 0$ and $x = h$ through 360° about the x -axis. Deduce the formula for the volume of a cone with height h and base radius r .



3. A section of the curve $y = \frac{1}{x}$ between $x = 1$ and $x = 2$ is rotated through 360° about both axes in turn. Show that the volume of revolution about the y -axis is twice that about the x -axis.

4. This ellipse has equation $\frac{x^2}{4} + y^2 = 1$. Find the coordinates of the points P and Q, and hence find the volume of the solid of revolution produced when the ellipse is rotated about the x -axis.



5. Repeat question 4 to find the volume of revolution of the ellipse about the y -axis.
6. The diagram shows the region R which lies between the line $y = x$ and the curve $y = x^3$ for $x \geq 0$.

Find the volume of the solid formed when the region R is rotated

- (i) about the x -axis.
(ii) about the y -axis.

