5.2) Volumes of revolution around the y-axis

Worked example	Your turn
A curve has equation $y = \sqrt{x-2}$. A finite region is bounded by the curve, the y-axis and the lines $y = 1$ and $y = 4$. The region is rotated through $360°$ about the y-axis. Find the volume of the solid generated.	A curve has equation $y = \sqrt{x-1}$. A finite region is bounded by the curve, the y-axis and the lines $y = 1$ and $y = 3$. The region is rotated through $360°$ about the y-axis. Find the volume of the solid generated.

$$\frac{1016\pi}{15}$$

Worked example	Your turn
A curve has equation $y = \sqrt[3]{3x + 1}$. A finite region is bounded by the curve, the y-axis and the lines $y = 2$ and $y = 5$. The region is rotated through $360°$ about the y-axis. Find the volume of the solid generated.	A curve has equation $y = \sqrt[3]{2x + 1}$. A finite region is bounded by the curve, the y-axis and the lines $y = 2$ and $y = 4$. The region is rotated through $360°$ about the y-axis. Find the volume of the solid generated. $$\frac{7715\pi}{14}$$

Worked example	Your turn
A curve has equation $x = y^2 - 4y + 8$. A finite region is bounded by the curve, the y-axis and the lines $y = 1$ and $y = 5$. a) Find the area of the region b) The region is rotated through 360° about the y-axis. Find the volume of the solid generated.	A curve has equation $x = y^2 - 6y + 10$. A finite region is bounded by the curve, the y-axis and the lines $y = 1$ and $y = 4$. a) Find the area of the region b) The region is rotated through 360° about the y-axis. Find the volume of the solid generated. a) 6 b) $\dfrac{78}{5}\pi$

Worked example	Your turn
$f(x) = x^2 - 6x + 9, x \geq 3$	$f(x) = x^2 - 2x + 1, x \geq 1$
A finite region is bounded by the curve $y = f(x)$, the y-axis and the lines $y = 1$ and $y = 4$ The region is rotated through 2π radians about the y-axis. Find the exact volume of the solid generated.	A finite region is bounded by the curve $y = f(x)$, the y-axis and the lines $y = 1$ and $y = 9$ The region is rotated through 2π radians about the y-axis. Find the exact volume of the solid generated. $$\frac{248}{3}\pi$$

Worked example | Your turn

Worked example

A curve has equation $y^2 = \frac{1}{3x+2}$

A finite region is bounded by the curve $y = f(x)$, the y-axis and the line $y = 5$

The region is rotated through 2π radians about the y-axis. Find the volume of the solid generated.

Your turn

A curve has equation $y^2 = \frac{1}{2x+1}$

A finite region is bounded by the curve $y = f(x)$, the y-axis and the line $y = 4$

The region is rotated through 2π radians about the y-axis. Find the volume of the solid generated.

$$\frac{117}{256}\pi$$