**Modelling with Volumes of Revolution**

Example

The diagram shows a model of a goldfish bowl. The cross-section of the model is described by the curve with parametric equations
$x=2\sin(t), y=2\cos(t)+2$, $\frac{π}{6}\leq t\leq \frac{11π}{6}$, where the units of $x$ and $y$ are in cm. The goldfish bowl is formed by rotating this curve about the $y$-axis to form a solid of revolution.

1. Find the volume of water required to fill the model to a height of 3cm.

The real goldfish bowl has a maximum diameter of 48cm.

(b) Find the volume of water required to fill the real goldfish bowl to the corresponding height.

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Ex4D p. 88-89