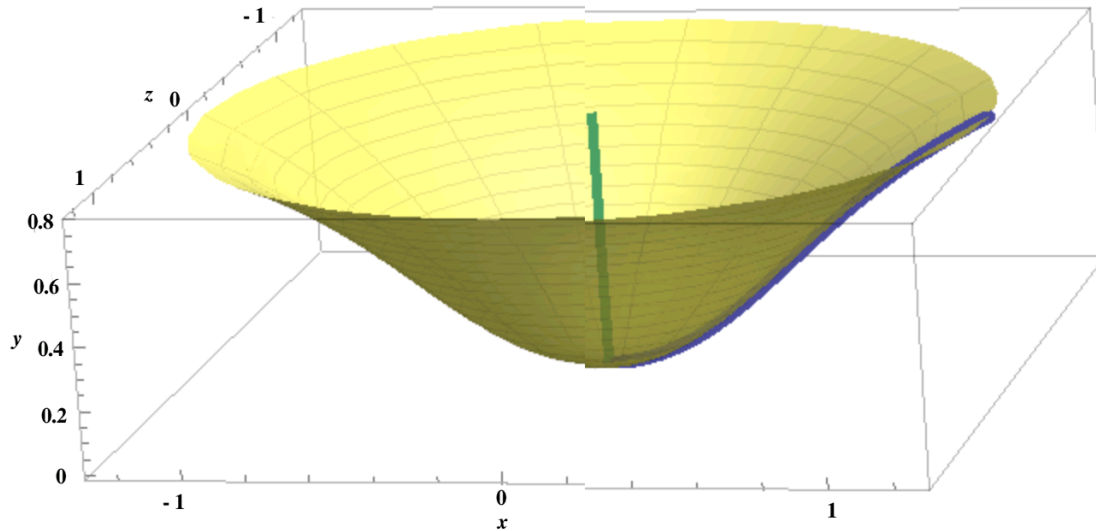


## 4.1 Revolving Integration By Parts



Find the exact volume swept out by the part of the following profile curve between the bounding lines given when it is rotated by  $2\pi^c$  about the  $y$ -axis.

$$x = \frac{\sqrt{y}}{\cos y}, \quad y = 0, \quad y = \frac{\pi}{4}$$

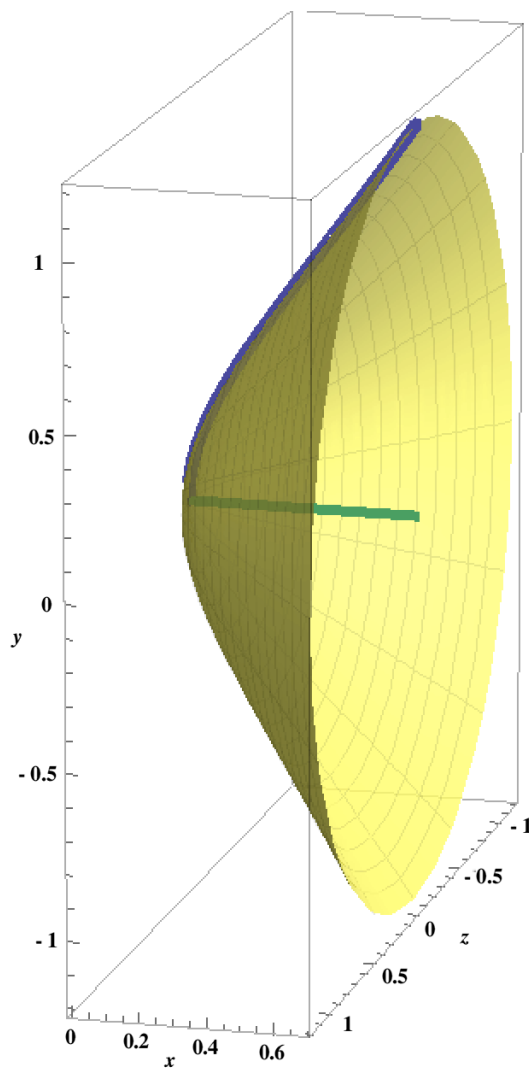
Teaching Video : <http://www.NumberWonder.co.uk/v9087/4.mp4>



## 4.2 Exercise

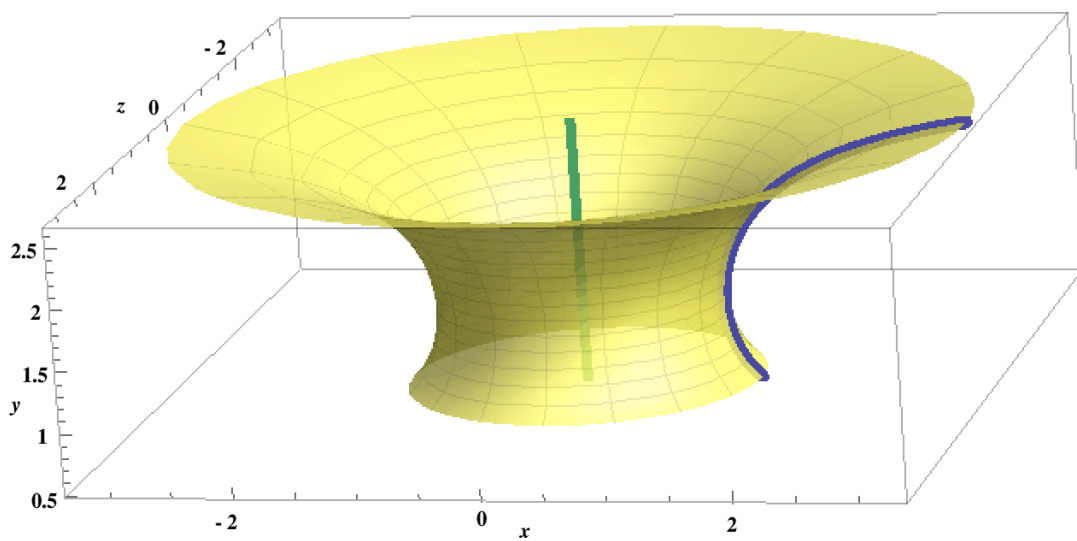
### Question 1

Show that the volume swept out by the curve  $y = \sqrt{x} e^{\frac{x}{2}}$  between  $x = 0$  and  $x = \ln 2$  when it is rotated by  $2\pi$  about the  $x$ -axis is exactly,  $\pi (2\ln(2) - 1)$

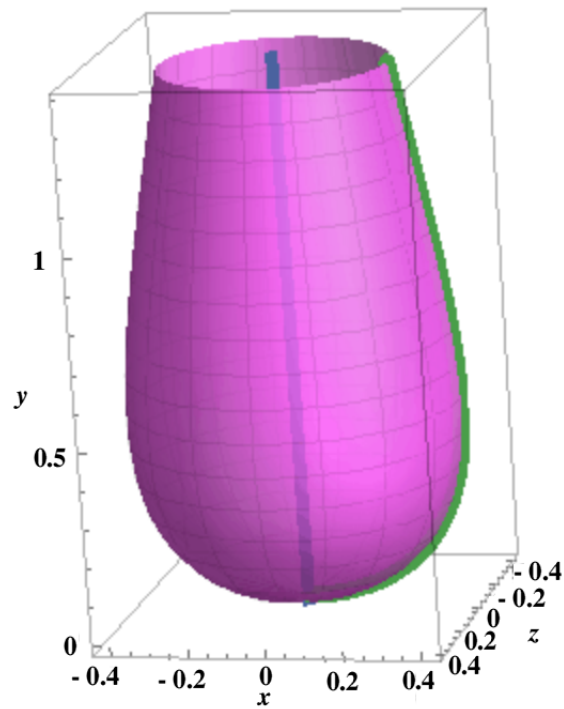


### Question 2

Show that the volume swept out by the curve  $x = \frac{\sqrt{y}}{\sin y}$  between  $y = \frac{\pi}{6}$  and  $y = \frac{5\pi}{6}$  when it is rotated by  $2\pi^c$  about the  $y$ -axis is exactly,  $\pi^2 \sqrt{3}$



### Question 3



Show that the volume swept out by the curve  $x = \sqrt{y} e^{-y}$  between  $y = 0$  and  $y = \ln 4$  when it is rotated by  $2\pi$  about the  $y$ -axis is exactly,  $\frac{\pi}{64} (15 - 2\ln 4)$

