

**MA114 Summer 2018**  
**Worksheet 20 – Surface Area – 7/18/18**

1. Find the surface areas of the surfaces generated by rotating the following curves around the specified axis between the given bounds.
  - a)  $y = x$  on  $[0, 4]$  around the  $x$ -axis
  - b)  $y = x^3$  on  $[0, 2]$  around the  $x$ -axis
  - c)  $x = e^{-y}$  for  $0 \leq y \leq 1$  around the  $y$ -axis
  - d)  $y = (4 - x^{2/3})^{3/2}$  for  $0 \leq x \leq 8$  around the  $x$ -axis
  - e)  $y = \frac{1}{4}x^2 - \frac{1}{2}\ln(x)$  on  $[1, e]$  around the  $x$ -axis
  - f)  $y = \sin(x)$  on  $[0, \pi]$  around the  $x$ -axis
  
2. Let  $R = \{(x, y) \mid x \geq 1, 0 \leq y \leq 1/x\}$ . Sketch the region  $R$ . Find the volume and surface area of the shape (called Gabriel's horn) generated by rotating  $R$  around the  $x$ -axis.