MATH 1700 Problem Workshop 12

1. Find the surface area of the following curves rotated about the given line.
   (a) $x = y^2, \quad 0 \le y \le 4$ about the x-axis.
   (b) $y = 2 + \sin x, \quad 0 \le x \le 2\pi$ about the x-axis. (just set up)
   (c) $y = \ln x, \quad 1 \le x \le e$ about the y-axis
   (d) $y = e^{-x}, \quad x \ge 0$ about the x-axis

2. Find the surface area of the following curves rotated about the given line.
   (a) $x = a\cos^3 t, \quad y = a\sin^3 t, \quad x \ge 0$ about the x-axis. $(a > 0)$
   (b) The circle $r = 2R\sin\theta$ about the x-axis. (Donut)