Definition. The equation
\[
\left(\frac{x}{3}\right)^2 + \left(\frac{y}{2}\right)^2 = 1
\] (1)
describes an ellipse centered at (0, 0) with a major axis of length 6 and a minor axis of length 4.

1. Show that the parametric equations \(x = 3 \cos \theta\) and \(y = 2 \sin \theta\) satisfy equation (1) and hence define the same ellipse.

2. Sketch the ellipse using the parametric equations.

3. Find an equation for the tangent line to the ellipse at the point determined by the given value of \(\theta\).
   a) \(\theta = \frac{\pi}{3}\)
   b) \(\theta = \frac{7\pi}{4}\)
4. Determine the area enclosed by the ellipse. You may need to use the half-angle formula \( \sin^2 x = \frac{1}{2}(1 - \cos 2x) \).

5. Set up an integral giving the circumference of the ellipse. Do not evaluate this integral.