Q 1. Convert the parametric equations

\[ x = 2 \sec t, \ y = 2 \tan t, \ -\frac{\pi}{2} < t < \frac{\pi}{2} \]

into Cartesian (rectangular) equation. Sketch the curve and indicate the direction in which it is traced.

Q 2. Find an equation of the tangent line at \( t = 1 \) for the curve

\[ x = \ln t, \ y = \sqrt{t + 1}. \]
Q1. Convert the parametric equations

\[ x = \cos 2t, \quad y = \sin t, \quad -\frac{\pi}{2} \leq t \leq \frac{\pi}{2} \]

into cartesian (rectangular) equation. Sketch the curve and indicate the direction in which it is traced.

Q2. Find the area of the surface obtained by rotating the curve (about the x-axis)

\[ x = 3 \cos t, \quad y = 3 \sin t, \quad 0 \leq t \leq \frac{\pi}{3}. \]
Q 1. Convert the parametric equations $x = t + \frac{1}{t}$, $y = t - \frac{1}{t}$, $t > 0$ into Cartesian (rectangular) equation. Sketch the curve and indicate the direction in which it is traced.

Q 2. Graph the set of points whose polar coordinates $(r, \theta)$ satisfy the given conditions:

(i) $\theta = -\frac{\pi}{4}$, $-3 \leq r \leq 3$

(ii) $\frac{\pi}{3} \leq \theta \leq \frac{2\pi}{3}$, $-2 \leq r \leq 0$