$\dfrac{4dy}{d\theta} = \dfrac{e^y \sin^2\theta}{y\sec\theta} \quad \Rightarrow \quad \dfrac{4y}{e^y}\,dy = \dfrac{\sin^2\theta}{\sec\theta}\,d\theta \quad \Rightarrow \quad 4\int ye^{-y}\,dy = \int \sin^2\theta\cos\theta\,d\theta$. Integrating the left side by parts with $u = y$, $dv = e^{-y}\,dy$ and the right side by the substitution $u = \sin\theta$, we obtain $-4ye^{-y} - 4e^{-y} = \frac{1}{3}\sin^3\theta + C$. We cannot solve explicitly for y.