89. (a) We integrate the angular acceleration (as a function of τ) with respect to τ to find the angular velocity as a function of $t > 0$.

$$\omega = \omega_0 + \int_0^t \left(4a\tau^3 - 3b\tau^2\right) d\tau = \omega_0 + at^4 - bt^3 \ .$$

(b) We integrate the angular velocity (as a function of τ) with respect to τ to find the angular position as a function of $t > 0$.

$$\theta = \theta_0 + \int_0^t \left(4a\tau^3 - 3b\tau^2\right) d\tau = \theta_0 + \omega_0 t + \frac{a}{5}t^5 - \frac{b}{4}t^4 \ .$$