3、3个，72个

4、(1) $\theta_0 = -5^\circ$，$\theta_f = 80^\circ$，$t_f = 4s$

$\therefore a_0 = -5$，$a_1 = 0$，$a_2 = 15.94$，$a_3 = -2.66$

$\theta(t) = -5 + 15.94t^2 - 2.66t^3$

$\dot{\theta}(t) = 31.88t - 7.98t^2$

$\ddot{\theta}(t) = 31.88 - 15.96t$

(2) $\theta_0 = -5^\circ$，$\theta_f = 80^\circ$，$t_f = 4s$

$\because \ddot{\theta} \geq \frac{4 \times 85^\circ}{16} = 21.25\,^\circ/s^2$

当 $\ddot{\theta} = 42\,^\circ/s^2$ 时，$t_{a1} = \left[\frac{4}{2} - \frac{\sqrt{42^2 \times 4^2 - 4 \times 42 \times 85}}{2 \times 42}\right] = 0.594s$

$\theta_{a1} = -5^\circ + \left(\frac{1}{2} \times 42 \times 0.594^2\right) = 2.4^\circ$

$\dot{\theta}_1 = \ddot{\theta}_1 t_{a1} = 42 \times 0.594 = 24.95\,^\circ/s$