

## Skyrocketing

A rocket is going to be fired directly upward. It has an initial mass  $m_0$ , a constant exhaust velocity of  $-u$ , and a constant rate of exhaust  $\partial m / \partial t = -\sigma$ . After exhausting a mass  $\Delta m$ , the rocket will have used all its fuel. Consider gravitational force to be constant and neglect air resistance. If all parameters other than  $\sigma$  are kept fixed, show that a greater  $\sigma$  results in a greater maximum altitude reached by the rocket.