A pendulum consists of a rod and two knife-edges separated from the center of mass \( l_1 \) and \( l_2 \) respectively (figure below left). The moment of inertia of the rod about the center of mass is \( I_0 = mk_g^2 \) where \( k_g \) is a constant called the radius of gyration. When the pendulum is pivoted about the upper knife-edge (figure below center), the period for small oscillations is \( T_1 \). When the pendulum is turned upside down and pivoted about the other edge (figure below right), and the period for small oscillations is \( T_2 \). The distances \( l_1 \) and \( l_2 \) are adjusted until \( T_1 = T_2 \). Express your answers to the following questions in terms of \( l_1, l_2 \), and \( T \) as needed.

a) What is the radius of gyration \( k_g \)?

b) Using your results from part (a), show that the gravitational acceleration \( g \) can be determined by measuring the length between the knife-edges \( l_1 + l_2 \) and the period \( T \).