

## Problem 1.16

### *Measuring $g$*

The acceleration of gravity can be measured by projecting a body upward and measuring the time that it takes to pass two given points in both directions.

Show that if the time the body takes to pass a horizontal line  $A$  in both directions is  $T_A$ , and the time to go by a second line  $B$  in both directions is  $T_B$ , then, assuming that the acceleration is constant, its magnitude is

$$g = \frac{8h}{T_A^2 - T_B^2},$$

where  $h$  is the height of line  $B$  above line  $A$ .

