

Name-code: \_\_\_\_\_

### Part B: Optional Problems

9. An object with mass  $M$  is dropped from rest and falls through air under the combined influence of the gravitational force of magnitude  $Mg$  and a frictional force opposite the direction of motion with magnitude  $bv^2$ , where  $b$  is a constant and  $v$  is the speed of the object. How far must the object fall to reach 90% of its terminal speed? Express your answer in terms of  $M$ ,  $g$ , and  $b$ .