Physics 15: Introductory Physics I

Problem set 1 due Oct 3 (from K+K):
Read Chap 1 and do problems:
1.12, 1.13, 1.16, 1.17, 1.18, 1.19, 1.20

Hints:

1.12: First solve for the height \( z(t) \) in terms of the unknowns \( z_A \) and \( v_A \) (the \( z \) value of A and the initial \( z \)-velocity at A) and the acceleration \( g \). Then ask: given that \( z = z_A \) when \( t = 0 \) and when \( t = T_A \), what does this tell me? Next, try to figure out the time it takes for the body to go from A to B (that is, go upward a distance \( h \)) in terms of \( T_A \) and \( T_B \) (hint: this is easy!) and then ask: is this all consistent with my expression for \( z(t) \)?

1.13: A time \( T_1 \), the height of the elevator is \( h \). What then is the relation between \( h \), \( T_1 \) and the velocity of the elevator? Then, write an expression for \( z(t) \) that is consistent with what you know.

1.16: Assume that the car accelerates uniformly from rest at \( t = 0 \) until some time \( t = t_0 \), when its velocity reaches some peak value \( v_0 \), and after that always brakes at its maximum rate until some total time \( t = T \) when it is at rest again. How must \( v_0 \), \( t_0 \) and \( T \) be related? Then, use the fact that you know the total distance.

Note: Problem sets due Fridays at 8:45 am (start of class) in P15 box near Wilder main entrance