108. (Fourth problem of **Cluster 1**)
The part 1 motion in this problem is simply that of constant velocity, so $x_B - x_0 = v_1 t_1$ applies with $t_1 = 5.00$ s and $x_0 = x_A = 0$ if we choose point A as the coordinate origin. Next, the part 2 motion consists of constant acceleration (so the equations of Table 2-1, such as Eq. 2-17, apply) with $x_0 = x_B$ (an unknown), $v_0 = v_B$ (also unknown, but equal to the v_1 above), $x_C = 300$ m, $v_C = 10.0$ m/s, and $t_2 = 20.0$ s. The equations describing parts 1 and 2, respectively, are therefore

$$\begin{aligned} x_B - x_A = v_1 t_1 \quad &\Longrightarrow \quad x_B = v_1(5.00) \\ x_C - x_B = \frac{1}{2}(v_B + v_C)\, t_2 \quad &\Longrightarrow \quad 300 - x_B = \frac{1}{2}(v_B + 10.0)\,(20.0) \end{aligned}$$

(a) We use the fact that $v_A = v_1 = v_B$ in solving this set of simultaneous equations. Adding equations, we obtain the result $v_1 = 13.3$ m/s.

(b) In order to find the acceleration, we use our result from part (a) as the initial velocity in Eq. 2-14 (applied to the part 2 motion):

$$v = v_0 + a t_2 \quad \Longrightarrow \quad 10.0 = 13.3 + a(20.0)$$

Thus, $a = -0.167$ m/s^2.