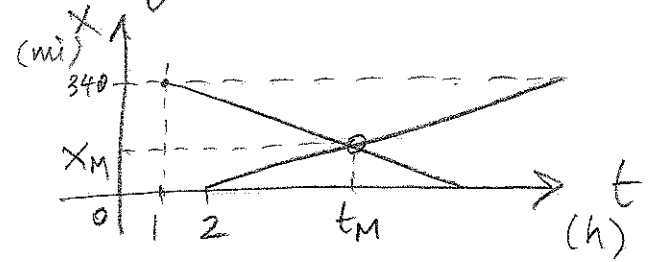


PREP

- known
- $(x_A)_i = 340$  mi
  - $(t_A)_i = 1$  h
  - $v_A = -60$  mi/h
  - $(x_B)_i = 0$
  - $(t_B)_i = 2$  h
  - $v_B = 45$  mi/h

- Find unknown
- meeting time  $t_M$
  - meeting location  $x_M$



- what sort of problem? uniform motion
- $x_f = x_i + v \Delta t$

SOLVE

$$(x_A)_f = (x_A)_i + v_A ((t_A)_f - (t_A)_i)$$

$$(x_B)_f = (x_B)_i + v_B ((t_B)_f - (t_B)_i)$$

Meet  $\left\{ \begin{array}{l} \text{at } x_M = (x_A)_f = (x_B)_f \\ \text{at time } t_M = (t_A)_f = (t_B)_f \end{array} \right.$

$$(x_A)_i + v_A t_M - v_A (t_A)_i = \cancel{(x_B)_i} + v_B t_M - \cancel{v_B (t_B)_i} + \cancel{v_B (t_B)_i}$$

$$(x_A)_i - v_A (t_A)_i + v_B (t_B)_i = v_B t_M - v_A t_M$$

$$= (v_B - v_A) t_M$$

$$340 \text{ mi} - (-60 \frac{\text{mi}}{\text{h}})(1 \text{ h}) + (45 \frac{\text{mi}}{\text{h}})2 \text{ h} = (45 \frac{\text{mi}}{\text{h}} - (-60 \frac{\text{mi}}{\text{h}})) t_M$$

$$\frac{340 + 60 + 90 \text{ mi}}{45 + 60 \frac{\text{mi}}{\text{h}}} = \frac{490 \text{ mi}}{105 \frac{\text{mi}}{\text{h}}} = 4.67 \text{ h} = t_M$$

$\rightarrow 4:40$  pm

$$x_M = v_B (4.67 \text{ h} - 2 \text{ h}) = (45 \frac{\text{mi}}{\text{h}})(2.67 \text{ h})$$

ASSESS

$$x_M < 340 \text{ mi}$$

$$x_M < 340 \text{ mi} / 2$$

$$= 120.2 \text{ mi}$$