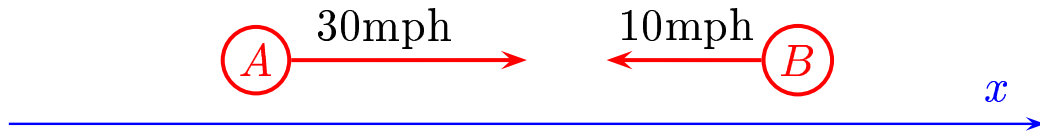


Car A travels at a speed of 30 mph to the right (positive x direction) and car B travels at 10 mph to the left.

Definition: v_{AB} is the velocity of car A as seen by the car B , or

(1) v_{BA} is of velocity of A relative to B

(2) In one dimensional motion we can write $\vec{v}_{AB} = v_{AB} \hat{i}$, where v_{AB} is a scalar quantity. It can have either a “+” or “-” sign.



Choose one:

- A) $v_{BA} = -40$ mph , $v_{AB} = -40$ mph
- B) $v_{BA} = -40$ mph , $v_{AB} = +40$ mph
- C) $v_{BA} = +40$ mph , $v_{AB} = +40$ mph
- D) $v_{BA} = +40$ mph , $v_{AB} = -40$ mph

Notice that the driver of car B sees car A is moving toward him/her

(*i.e.*, along the x -direction), with a speed greater than $v_A = 30$ mph. The algebra involved is given by

$$\begin{aligned}v_B &= -10 \text{ mph} \\v_A &= +30 \text{ mph} \\v_{BA} &\equiv v_A - v_B = (-10) - (+30) = -40 \text{ mph}\end{aligned}$$

$$v_{AB} \equiv v_B - v_A = (+30) - (-10) = -v_{BA} = +40 \text{ mph}.$$

Answer **D**.

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