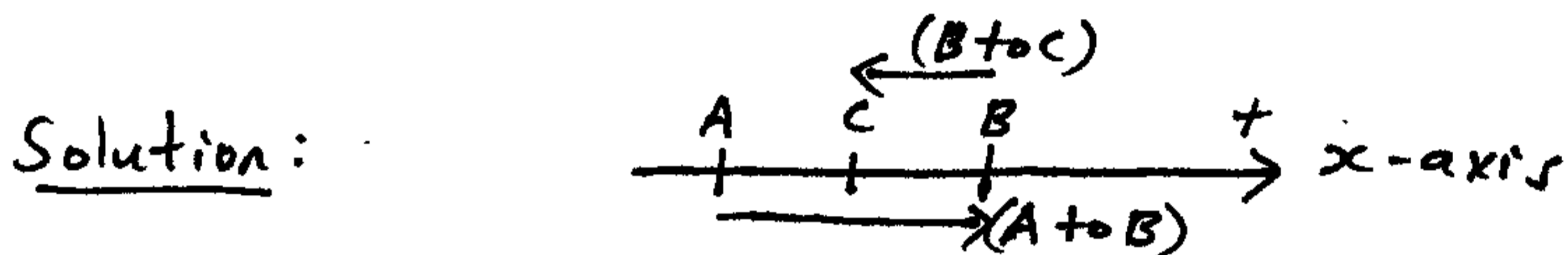


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This is a 1-D problem involving average velocity and average speed.

An object moves along the positive x -axis at 2 m/s , from point A to point B. It then moves at 3 m/s , from point B to point C. If point C is located halfway between points A and B, what is the average velocity and average speed of the object between points A and C?



Let d_1 be the distance between A and B.
Let d_2 be the distance between B and C.

$$\text{Time interval between A and C: } \Delta t = \frac{d_1}{2} + \frac{d_2}{3}$$

Point C is halfway between A and B,
so $d_2 = \frac{1}{2} d_1$, substitute: $\Delta t = \frac{d_1}{2} + \frac{1}{3} \left(\frac{1}{2} d_1 \right)$

$$\text{and } \Delta t = \frac{2d_1}{3}$$

$$\text{Displacement between A and C} = d_1 - d_2 = \frac{1}{2} d_1 = \Delta x$$

$$\text{Total travel distance between A and C} = d_1 + d_2 = \frac{3}{2} d_1$$

$$\text{Average velocity: } \bar{v} = \frac{\Delta x}{\Delta t} = \frac{\frac{1}{2} d_1}{\frac{2d_1}{3}} = \frac{3}{4} \text{ m/s (answer)}$$

$$\text{Average speed: } \bar{s} = \frac{\text{Total distance}}{\Delta t} = \frac{\frac{3}{2} d_1}{\frac{2}{3} d_1} = \frac{9}{4} \text{ m/s (answer)}$$