Solution to Example 2:

\[ \begin{align*} \text{A} & \quad \text{B} \\ 100 \text{ km/h} & \quad 150 \text{ km/h} \end{align*} \]

\[ \begin{align*} V_{AB} = 100 \text{ km/h} \\ V_{BA} = -150 \text{ km/h} \end{align*} \]

Average velocity = \[ \frac{\text{Total Displacement}}{\text{Total Time}} \]

Total Displacement of train = 0, since it starts and finishes at same station.

\[ \therefore \text{Average velocity of train} = 0 \text{ km/h}. \]

Now let the distance between the two stations be \(d\).

Average speed = \[ \frac{\text{Total distance}}{\text{Total Time}} \]

Total distance covered by train = 2\(d\)

Total time taken by train = \[ \frac{d}{100} + \frac{d}{150} \]

\[ \text{(since time} = \frac{\text{distance}}{\text{speed}}\text{)} \]

\[ = 0.016d \]

\[ \therefore \text{Average speed of train} = \frac{2d}{0.016d} = 120 \text{ km/h}. \]

Clearly, the average speed of the train, 120 km/h, is of larger magnitude than the average velocity of the train, 0 km/h.

(Note: If you make a mistake, cross it out neatly. Don't make a mess!)