A Word Problem!

Justin's average speed on his way to school is 40 mi/h, and his average speed on the way home is 45 mi/h. What is Justin's average speed for the entire trip? Round to the nearest tenth.

$$\text{Avg. speed} = \frac{\text{Total distance}}{\text{total time}}$$

Distance = d → Justin's house to the school

$$\frac{\text{Distance}}{\text{rate}} = \text{time}$$

To school: $\text{Time} = \frac{d}{40}$ From school: $T = \frac{d}{45}$

$$\text{Total time} = \frac{d}{40} + \frac{d}{45} \qquad \text{Total dist} = 2d$$

LCD: 360

$$\text{Avg. speed} = \frac{2d}{\frac{d}{40} + \frac{d}{45}}$$

$$\frac{(2d)(360)}{\left(\frac{d}{40} + \frac{d}{45}\right)\left(\frac{360}{1}\right)} = \frac{720d}{\left(\frac{d}{40}\right)\left(\frac{360}{1}\right) + \left(\frac{d}{45}\right)\left(\frac{360}{1}\right)}$$

$$\frac{720d}{9d + 8d} = \frac{720d}{17d} = 42.4 \text{ mi/h}$$