Answer on Question #48013, Physics, Mechanics | Kinematics | Dynamics

Question:

For his daily training, an athlete runs a round a 15.0 m radius track five times in 2.50 minutes. What is his average speed? and average velocity?

Answer:

Velocity is a vector, having both a direction and a magnitude. Average velocity equals:

$$|\overrightarrow{v_a}| = \frac{displacement}{time}$$

For complete lap displacement equals 0. Therefore average velocity equals:

$$|\overrightarrow{v_a}| = \frac{0}{t} = 0$$

Average speed equals:

$$v_a = \frac{total\ distance}{total\ time} = \frac{5 \cdot 2 \cdot \pi \cdot 15}{170}\frac{m}{s} = 2.77\frac{m}{s}$$

Answer: average speed = 2.77 m/s, average velocity = 0 m/s