

Answer on Question #51359, Physics, Mechanics | Kinematics | Dynamics

Compute your average velocity in the following two cases: (a) You walk 88.0 m at a speed of 2.24 m/s and then run 88.0 m at a speed of 3.28 m/s along a straight track. (b) You walk for 1.00 min at a speed of 2.24 m/s and then run for 1.50 min at 3.28 m/s along a straight track.

Solution.

a) From the formula $v = \frac{s}{t}$ we have

$$2,24 = \frac{88}{t_1} \Rightarrow t_1 = \frac{88}{2,24} = \frac{11}{0,28};$$

$$3,28 = \frac{88}{t_2} \Rightarrow t_2 = \frac{88}{3,28} = \frac{11}{0,41}.$$

Thus, whole distance $s = 88 + 88 = 176m$ has been passed for

$$\begin{aligned} t = t_1 + t_2 &= \frac{11}{0,28} + \frac{11}{0,41} = \frac{1100}{28} + \frac{1100}{41} = 1100 \cdot \frac{41 + 28}{1148} = \\ &= 1100 \cdot \frac{69}{1148} = 275 \cdot \frac{69}{287} = \frac{18975}{287}. \end{aligned}$$

So

$$v = \frac{s}{t} = \frac{176}{\frac{18975}{287}} = \frac{50512}{18975} \approx 2,66m/s$$

b) We know that

$$1\text{min} = 60s;$$

$$1,50\text{min} = 90s.$$

From the formula $v = \frac{s}{t}$ we have

$$2,24 = \frac{s_1}{60} \Rightarrow s_1 = 60 \cdot 2,24 = 134,4;$$

$$3,28 = \frac{s_2}{90} \Rightarrow s_2 = 90 \cdot 3,28 = 295,2.$$

Thus, whole distance $s = 134,4 + 295,2 = 429,6m$ has been passed for

$$t = t_1 + t_2 = 60 + 90 = 150s.$$

So

$$v = \frac{s}{t} = \frac{429,6}{150} = 2,864 \text{ m/s}$$

Answer: a) $v \approx 2,66 \text{ m/s}$; b) $v = 2,864 \text{ m/s}$.

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