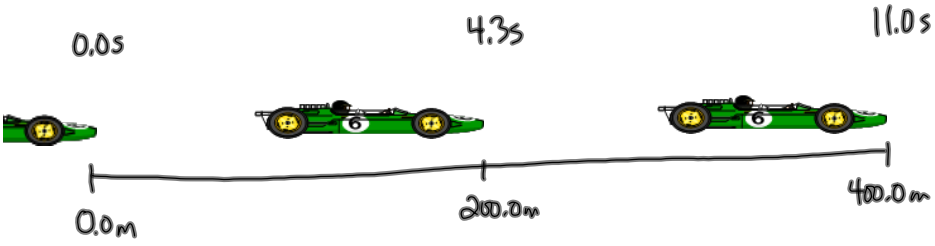
MP 1.42



Given

$\vec{d}_0 = 0.0\,m$
$\vec{d}_1 = 200.0\,m\,[E]$
$\vec{d}_2 = 400.0\,m\,[E]$

$t_0 = 0.0\,s$
$t_1 = 4.3\,s$
$t_2 = 11.0\,s$

Required

a) $\vec{V}_{ave\,(0-1)} = ?$
b) $\vec{V}_{ave\,(1-2)} = ?$
c) $\vec{V}_{ave\,(0-2)} = ?$

Analysis + Solution

a) analysis

$$\vec{V}_{ave} = \frac{\Delta \vec{d}}{\Delta t}$$

$$\vec{V}_{ave\,(0-1)} = \frac{\vec{d}_1 - \vec{d}_0}{t_1 - t_0}$$

solution

$$\vec{V}_{ave\,(0-1)} = \frac{200.0\,m\,[E] - 0.0\,m}{4.3\,s - 0.0\,s}$$

$$\vec{V}_{ave\,(0-1)} = \frac{200.0\,m\,[E]}{4.3\,s}$$

$$\vec{V}_{ave\,(0-1)} \doteq 47\,\frac{m}{s}\,[E]$$

b) $\vec{V}_{ave\,(1-2)} = \frac{\Delta \vec{d}}{\Delta t}$

$$\vec{V}_{ave\,(1-2)} = \frac{\vec{d}_2 - \vec{d}_1}{t_2 - t_1}$$

$$\vec{V}_{ave\,(1-2)} = \frac{400.0\,m\,[E] - 200.0\,m\,[E]}{11.0\,s - 4.3\,s}$$

$$\vec{V}_{ave\,(1-2)} = \frac{200.0\,m\,[E]}{6.7\,s}$$

$$\vec{V}_{ave\,(1-2)} \doteq 3.0 \times 10^{1}\,\frac{m}{s}\,[E]$$

c) $\vec{V}_{ave\,(0-2)} = \frac{\Delta \vec{d}}{\Delta t}$

$$\vec{V}_{ave\,(0-2)} = \frac{\vec{d}_2 - \vec{d}_0}{t_2 - t_0}$$

$$\vec{V}_{ave\,(0-2)} = \frac{400.0\,m\,[E] - 0}{11.0\,s - 0}$$

$$\vec{V}_{ave\,(0-2)} = \frac{400.0\,m\,[E]}{11.0\,s}$$

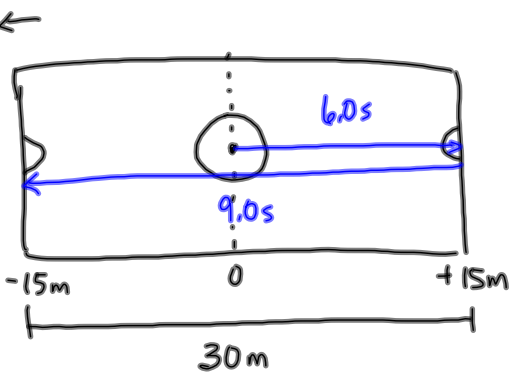
$$\vec{V}_{ave\,(0-2)} \doteq 36.4\,m/s\,[E]$$

NOTE The average velocity for the whole trip is not the average of the two velocities for each part of the trip!!

Paraphrase:

a) The average velocity for the first 200.0m was 47m/s [E]
b) " " second 200.0m was 30 m/s [E]
c) " " for the whole trip was 36.4m/s [E]

MP|44



Given:

$\vec{d}_0 = 0\ m$
$\vec{d}_1 = +15\ m$
$\vec{d}_2 = -15\ m$

$\Delta t_{0-1} = 6.0s$
$\Delta t_{1-2} = 9.0s$

Required:

a) $\vec{v}_{ave(0-1)} = ?$

b) $\vec{v}_{ave(1-2)} = ?$

Analysis + Solution

a) $\vec{v}_{ave(0-1)} = \frac{\Delta \vec{d}}{\Delta t}$

$\vec{v}_{ave(0-1)} = \frac{\vec{d}_1 - \vec{d}_0}{\Delta t}$

$\vec{v}_{ave(0-1)} = \frac{+15m - 0m}{6.0s}$

$\vec{v}_{ave(0-1)} = +2.5 \frac{m}{s}$

↑ toward the opponent's net

b) $\vec{v}_{ave(1-2)} = \frac{\Delta \vec{d}}{\Delta t}$

$\vec{v}_{ave(1-2)} = \frac{\vec{d}_2 - \vec{d}_1}{\Delta t}$

$\vec{v}_{ave(1-2)} = \frac{-15m - (+15m)}{9.0s}$

$\vec{v}_{ave(1-2)} = -\frac{30m}{9.0s}$

$\vec{v}_{ave(1-2)} = -3.3 \frac{m}{s}$

↑ toward your own net.

Paraphrase:

a) The average velocity for the first 6.0s was +2.5m/s

b) The average velocity for the last 9.0s was −3.3m/s

TO DO:

① PP|45-46

② Velocity Review 6-13