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SREDNJA BRZINA – DELOVI VREMENA –

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1. Telo je polovinu vremena išlo brzinom 5 m/s , a drugu polovinu vremena 10 m/s. Kolika je srednja brzina tela na celom putu?

$t_1 = \frac{t}{2}$

$v_1 = 5\,\frac{m}{s}$

$t_2 = \frac{t}{2}$

$v_2 = 10\,\frac{m}{s}$

$v_{sr} = ?$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S_1 + S_2}{t} = \frac{v_1 \cdot t_1 + v_2 \cdot t_2}{t} = \frac{v_1 \cdot \frac{t}{2} + v_2 \cdot \frac{t}{2}}{t} = \frac{\frac{v_1 \cdot t}{2} + \frac{v_2 \cdot t}{2}}{t} = \frac{t \cdot \left(\frac{v_1}{2} + \frac{v_2}{2}\right)}{t} = \frac{v_1}{2} + \frac{v_2}{2}$$

$$\boldsymbol{v_{sr} = \frac{v_1 + v_2}{2}}$$

$$v_{sr} = \frac{5\,\frac{m}{s} + 10\,\frac{m}{s}}{2} = \frac{15\,\frac{m}{s}}{2} = 7{,}5\,\frac{m}{s}$$

$S_u = S_1 + S_2$

$S_1 = v_1 \cdot t_1$

$S_2 = v_2 \cdot t_2$

$$v_1 \cdot \frac{t}{2} = \frac{v_1}{1} \cdot \frac{t}{2} = \frac{v_1 \cdot t}{2}$$

$$v_2 \cdot \frac{t}{2} = \frac{v_2}{1} \cdot \frac{t}{2} = \frac{v_2 \cdot t}{2}$$

$$\boldsymbol{v_{sr} = \frac{v_1 + v_2 + v_3}{3}}$$

2. Telo je trećinu vremena išlo brzinom 5 m/s , drugu trećinu vremena 10 m/s i treću trećinu vremena 15 m/s. Kolika je srednja brzina tela na celom putu?

$t_1 = \frac{t}{3}$

$v_1 = 5\,\frac{m}{s}$

$t_2 = \frac{t}{3}$

$v_2 = 10\,\frac{m}{s}$

$t_3 = \frac{t}{3}$

$v_3 = 15\,\frac{m}{s}$

$v_{sr} = ?$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S_1 + S_2 + S_3}{t} = \frac{v_1 \cdot t_1 + v_2 \cdot t_2 + v_3 \cdot t_3}{t} = \frac{v_1 \cdot \frac{t}{3} + v_2 \cdot \frac{t}{3} + v_3 \cdot \frac{t}{3}}{t}$$

$$v_{sr} = \frac{\frac{v_1 \cdot t}{3} + \frac{v_2 \cdot t}{3} + \frac{v_3 \cdot t}{3}}{t} = \frac{t \cdot \left(\frac{v_1}{3} + \frac{v_2}{3} + \frac{v_3}{3}\right)}{t} = \frac{v_1}{3} + \frac{v_2}{3} + \frac{v_3}{3} = \frac{\boldsymbol{v_1 + v_2 + v_3}}{\boldsymbol{3}}$$

$$\boldsymbol{v_{sr} = \frac{v_1 + v_2 + v_3}{3}}$$

$$v_{sr} = \frac{5\,\frac{m}{s} + 10\,\frac{m}{s} + 15\,\frac{m}{s}}{3} = \frac{30\,\frac{m}{s}}{3} = 10\,\frac{m}{s}$$

3. Telo je četvrtinu vremena išlo brzinom 5 m/s , drugu četvrtinu vremena 10 m/s, treću četvrtinu vremena 15 m/s i četvrtu četvrtinu vremena brzinom 20 m/s . Kolika je srednja brzina tela na celom putu?

$t_1 = \frac{t}{4}$ $v_1 = 5\frac{m}{s}$

$t_2 = \frac{t}{4}$ $v_2 = 10\frac{m}{s}$

$t_3 = \frac{t}{4}$ $v_3 = 15\frac{m}{s}$

$t_4 = \frac{t}{4}$ $v_4 = 20\frac{m}{s}$

$v_{sr} = ?$

$$v_{sr} = \frac{v_1 + v_2 + v_3 + v_4}{4}$$

$$v_{sr} = \frac{5\frac{m}{s} + 10\frac{m}{s} + 15\frac{m}{s} + 20\frac{m}{s}}{4} = \frac{50\frac{m}{s}}{4} = 12{,}5\ \frac{m}{s}$$

4. Telo je trećinu vremena išlo brzinom 5 m/s , a ostatak vremena 10 m/s. Kolika je srednja brzina tela na celom putu?

$t_1 = \frac{t}{3}$

$v_1 = 5\frac{m}{s}$

$t_2 = \frac{2 \cdot t}{3}$

$v_2 = 10\frac{m}{s}$

$v_{sr} = ?$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S_1 + S_2}{t} = \frac{v_1 \cdot t_1 + v_2 \cdot t_2}{t} = \frac{v_1 \cdot \frac{t}{3} + v_2 \cdot \frac{2 \cdot t}{3}}{t} = \frac{\frac{v_1 \cdot t}{3} + \frac{v_2 \cdot 2 \cdot t}{3}}{t}$$

$$v_{sr} = \frac{t \cdot \left(\frac{v_1}{3} + \frac{2 \cdot v_2}{3}\right)}{t} = \frac{v_1}{3} + \frac{2 \cdot v_2}{3} = \frac{\boldsymbol{v_1 + 2 \cdot v_2}}{\boldsymbol{3}}$$

$$\boldsymbol{v_{sr} = \frac{v_1 + 2 \cdot v_2}{3}}$$

$$v_{sr} = \frac{5\frac{m}{s} + 2 \cdot 10\frac{m}{s}}{3} = \frac{25\frac{m}{s}}{3} = 8{,}33\frac{m}{s}$$

$t_1 = \frac{t}{3}$ $\qquad$ $t_2 = \frac{2}{3}t = \frac{2 \cdot t}{3}$