SREDNJA BRZINA – DELOVI PUTA –

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1. Automobil je polovinu puta išao srednjom brzinom 5 m/s , a drugi polovinu puta srednjom brzinom 10 m/s. Kolika je srednja brzina na celom putu?

$S_1 = \frac{S}{2}$

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

$S_2 = \frac{S}{2}$

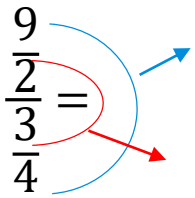
$v_2 = 10\frac{m}{s}$

$v_{sr} = ?$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S}{t_1 + t_2} = \frac{S}{\frac{S_1}{v_1} + \frac{S_2}{v_2}} = \frac{S}{\frac{S}{2 \cdot v_1} + \frac{S}{2 \cdot v_2}} = \frac{S}{S \cdot \left(\frac{1}{2 \cdot v_1} + \frac{1}{2 \cdot v_2}\right)} = \frac{1}{\frac{1}{2 \cdot v_1} + \frac{1}{2 \cdot v_2}}$$

$$v_{sr} = \frac{1}{\frac{1}{2 \cdot 5\frac{m}{s}} + \frac{1}{2 \cdot 10\frac{m}{s}}} = \frac{1}{\frac{1}{10\frac{m}{s}} + \frac{1}{20\frac{m}{s}}} = \frac{1}{\frac{2}{20\frac{m}{s}} + \frac{1}{20\frac{m}{s}}} = \frac{1}{\frac{3}{20\frac{m}{s}}} = \frac{\frac{1}{1}}{\frac{3}{20\frac{m}{s}}} = \frac{1 \cdot 20\frac{m}{s}}{1 \cdot 3}$$

$$v_{sr} = \frac{20\frac{m}{s}}{3} \approx 6{,}67\frac{m}{s}$$



$$\frac{\frac{9}{2}}{\frac{3}{4}} = \frac{9 \cdot 4}{2 \cdot 3} = \frac{36}{6} = 6$$

$t_u = t_1 + t_2$

$t_1 = \frac{S_1}{v_1}$

$t_2 = \frac{S_2}{v_2}$

$$\frac{S_1}{v_1} = \frac{\frac{S}{2}}{\frac{v_1}{1}} = \frac{1 \cdot S}{2 \cdot v_1} = \frac{S}{2 \cdot v_1}$$

$$\frac{S_2}{v_2} = \frac{\frac{S}{2}}{\frac{v_2}{1}} = \frac{1 \cdot S}{2 \cdot v_2} = \frac{S}{2 \cdot v_2}$$

2. Automobil je trećinu puta išao srednjom brzinom 10 m/s , a ostatak puta srednjom brzinom 20 m/s. Kolika je srednja brzina na celom putu?

$$S_1 = \frac{1}{3}S = \frac{S}{3}$$

$$v_1 = 10\frac{m}{s}$$

$$S_2 = \frac{2}{3}S = \frac{2 \cdot S}{3}$$

$$v_2 = 20\frac{m}{s}$$

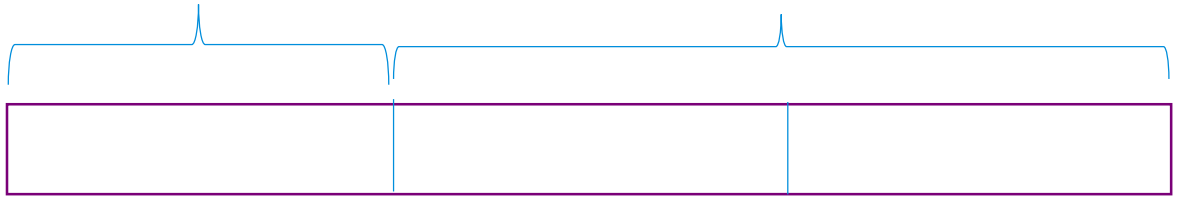
$$v_{sr} = ?$$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S}{t_1 + t_2} = \frac{S}{\frac{S_1}{v_1} + \frac{S_2}{v_2}} = \frac{S}{\frac{S}{3 \cdot v_1} + \frac{2 \cdot S}{3 \cdot v_2}} = \frac{S}{S \cdot \left(\frac{1}{3 \cdot v_1} + \frac{2}{3 \cdot v_2}\right)} = \frac{1}{\frac{1}{3 \cdot v_1} + \frac{2}{3 \cdot v_2}}$$

$$v_{sr} = \frac{1}{\frac{1}{3 \cdot 10\frac{m}{s}} + \frac{2}{3 \cdot 20\frac{m}{s}}} = \frac{1}{\frac{1}{30\frac{m}{s}} + \frac{2}{60\frac{m}{s}}} = \frac{1}{\frac{2}{60\frac{m}{s}} + \frac{2}{60\frac{m}{s}}} = \frac{1}{\frac{4}{60\frac{m}{s}}} = \frac{1}{\frac{4}{60\frac{m}{s}}}$$

$$v_{sr} = \frac{1 \cdot 60\frac{m}{s}}{1 \cdot 4} = \frac{60\frac{m}{s}}{4} = 15\frac{m}{s}$$

$$S_1 = \frac{1}{3}S = \frac{S}{3} \qquad S_2 = \frac{2}{3}S = \frac{2 \cdot S}{3}$$



3. Automobil je četvrtinu puta išao srednjom brzinom 10 m/s , dve petine puta išao je srednjom brzinom 5 m/s, a ostatak puta srednjom brzinom 20 m/s. Kolika je srednja brzina na celom putu?

$$S_1 = \frac{1}{4}S = \frac{S}{4}$$

$$v_1 = 10\frac{m}{s}$$

$$S_2 = \frac{2}{5}S = \frac{2\cdot S}{5}$$

$$v_2 = 5\frac{m}{s}$$

$$S_3 = \frac{7\cdot S}{20}$$

$$v_3 = 20\frac{m}{s}$$

$$v_{sr} = ?$$

$$v_{sr} = \frac{S_u}{t_u} = \frac{S}{t_1 + t_2 + t_3} = \frac{S}{\frac{S_1}{v_1} + \frac{S_2}{v_2} + \frac{S_3}{v_3}} = \frac{S}{\frac{S}{4\cdot v_1} + \frac{2\cdot S}{5\cdot v_2} + \frac{7\cdot S}{20\cdot v_2}}$$

$$v_{sr} = \frac{S}{S\cdot\left(\frac{1}{4\cdot v_1} + \frac{2}{5\cdot v_2} + \frac{7}{20\cdot v_3}\right)} = \frac{1}{\frac{1}{4\cdot v_1} + \frac{2}{5\cdot v_2} + \frac{7}{20\cdot v_3}}$$

$$v_{sr} = \frac{1}{\frac{1}{4\cdot v_1} + \frac{2}{5\cdot v_2} + \frac{7}{20\cdot v_3}} = \frac{1}{\frac{1}{4\cdot 10\frac{m}{s}} + \frac{2}{5\cdot 5\frac{m}{s}} + \frac{7}{20\cdot 20\frac{m}{s}}} = \frac{1}{\frac{1}{40\frac{m}{s}} + \frac{2}{25\frac{m}{s}} + \frac{7}{400\frac{m}{s}}}$$

$$v_{sr} = \frac{1}{\frac{10}{400\frac{m}{s}} + \frac{32}{400\frac{m}{s}} + \frac{7}{400\frac{m}{s}}} = \frac{1}{\frac{49}{400\frac{m}{s}}} = \frac{\frac{1}{1}}{\frac{49}{400\frac{m}{s}}} = \frac{400\frac{m}{s}}{49} \approx 8{,}16\frac{m}{s}$$

$$S_3 = S - \left(\frac{S}{4} + \frac{2\cdot S}{5}\right) = \frac{S}{1} - \left(\frac{5\cdot S}{20} + \frac{8\cdot S}{20}\right) = \frac{S}{1} - \frac{13\cdot S}{20} = \frac{20\cdot S}{20} - \frac{13\cdot S}{20} = \frac{7\cdot S}{20}$$