4. –/1 points Notes Question: Giancoli6 2.P.070.

A race car driver must average 195.0 km/h over the course of a time trial lasting ten laps. If the first nine laps were done at 190.0 km/h, what average speed must be maintained for the last lap? (Answer to the nearest km/h.)

_____ km/h

$\bar{v} = 195$ km/h

$d_t = 10L$

$\bar{v}_9 = 190$ km/h

$\bar{v}_1 = ?$

$d_t = \bar{v}\, t_t \rightarrow t_t = \frac{d_t}{\bar{v}}$

$\bar{v} = \frac{d_t}{t_t} = \frac{10L}{t_9 + t_1} = \frac{10L}{\frac{9L}{\bar{v}_9} + \frac{1L}{\bar{v}_1}}$

$\bar{v} = \frac{10L}{\frac{9L}{\bar{v}_9} + \frac{1L}{\bar{v}_1}}$

$$\bar{V} = \frac{10\,L}{\frac{9L}{\bar{V}_9} + \frac{1L}{\bar{V}_1}}$$

$$(195\,km/h) = \frac{10}{\frac{9}{(190\,km/h)} + \frac{1}{\bar{V}_1}}$$

$$\frac{9}{190\,km/h} + \frac{1}{\bar{V}_1} = \frac{10}{195\,km/h}$$

$$\frac{1}{\bar{V}_1} = \frac{10}{195\,km/h} - \frac{9}{190\,km/h}$$

$$\frac{1}{\bar{V}_1} = \frac{10}{185\ km/h} - \frac{9}{190\ km/h}$$

$$\boxed{\bar{V}_1 = 256\ km/h}$$

10. –/2 points Notes Question: Giancoli6 2.P.073.

An automobile traveling 100 km/h overtakes a 1.00 km long train traveling in the same direction on a track parallel to the road.

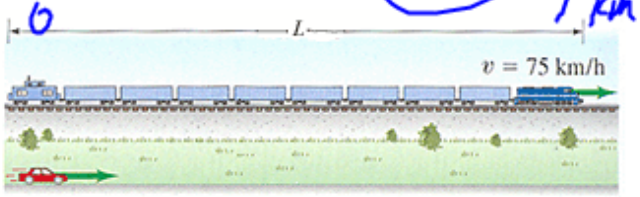

Figure 2-40

If the train's speed is 75 km/h, how long does it take the car to pass it?

_____ min

How far will the car have traveled in this time?

_____ km

See Figure 2-40. What are the results if the car and train are traveling in opposite directions?

_____ s

_____ km

$\vec{d} = \vec{d}_o + \vec{v}_i \Delta t + \frac{1}{2}\vec{a}\Delta t^2$

train $d = (1\,km) + (75\,km/h)t$

car $d = (0\,km) + (100\,km/h)t$

$1\,km + (75\,km/h)t = (100\,km/h)t$

$1\,km = (25\,km/h)t$

$t = 0.04\,h = 2.4\,min$

$d = (0\,km) + (100\,km/h)t$

$d = (100\,km/h)(.04\,h)$

$d = 4.00\,km$

train $(d + 1\,km) = (1\,km) + (75\,km/h)\,t$

car $d = (1\,km) + (-100\,km/h)\,t$

$d = 0\,km + (+100\,km/h)\,t$

$d = (+100\,km/h)\left(\frac{1}{175}\,h\right)$

$d = 0.571\,km$

distance

so

$(1\,km + (-100\,km/h)\,t + 1\,km) = 1\,km + (75\,km/h)\,t$

$1\,km - (100\,km/h)\,t = (75\,km/h)\,t$

$1\,km = (175\,km/h)\,t$

$t = 20.6\,s$