

Answer on Question #50328 – Physics – Other

1. Sally travels by car from one city to another. She drives for 20.0 min at 84.0 km/h, 55.0 min at 40.0 km/h, and 23.0 min at 77.0 km/h, and she spends 11.0 min eating lunch and buying gas. Determine the average speed for the trip.

$$t_1 = \frac{1}{3} h$$

$$v_1 = 84 \frac{km}{h}$$

$$t_2 = \frac{11}{12} h$$

$$v_2 = 40 \frac{km}{h}$$

$$t_3 = \frac{23}{60} h$$

$$v_3 = 77 \frac{km}{h}$$

$$t_4 = \frac{11}{60} h$$

$$\bar{v} = ?$$

Solution.

The average speed can be found if we the total distance divide by the elapsed time:

$$\bar{v} = \frac{l_1 + l_2 + l_3}{t_1 + t_2 + t_3 + t_4} = \frac{v_1 t_1 + v_2 t_2 + v_3 t_3}{t_1 + t_2 + t_3 + t_4}$$

Let check the dimension: $[\bar{v}] = \frac{\frac{km}{h} \cdot h}{h} = \frac{km}{h}$.

Let evaluate the quantity: $\bar{v} = \frac{84 \cdot \frac{1}{3} + 40 \cdot \frac{11}{12} + 77 \cdot \frac{23}{60}}{\frac{1}{3} + \frac{11}{12} + \frac{23}{60} + \frac{11}{60}} = 51.84 \left(\frac{km}{h} \right)$.

Answer: $51.84 \frac{km}{h}$.