

Question#24540

a person travels by car from one city to another with different constant speeds between pairs of cities. she drives for 30 min at 80 km/h, 12 min at 100 km/h, and 45 min at 40 km/h and spends 15 min eating lunch and buying gas. a) determine the average speed for the trip. b) determine the distance between the initial and final cities along the route

Solution:

Let:

$$t_1 = 30 \text{ min} = 0.5 \text{ h}$$

$$t_2 = 12 \text{ min} = 0.2 \text{ h}$$

$$t_3 = 45 \text{ min} = 0.75 \text{ h}$$

$$t_4 = 15 \text{ min} = 0.25 \text{ h}$$

$$v_1 = 80 \text{ km/h}$$

$$v_2 = 100 \text{ km/h}$$

$$v_3 = 40 \text{ km/h}$$

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$$v = ?, \quad S = ?$$

$$S = S_1 + S_2 + S_3 = v_1 * t_1 + v_2 * t_2 + v_3 * t_3$$

$$S = 80 * 0.5 + 100 * 0.2 + 40 * 0.75 = 90 \text{ km}$$

$$v = \frac{S}{t_1 + t_2 + t_3 + t_4} = \frac{90}{0.5 + 0.2 + 0.75 + 0.25} = 53 \text{ km/h}$$

**Answer: the average speed is 53 km/h, the distance between cities is 90 km.**