Problem.

Sally travels by car from one city to another. She drives for 25.0 min at 59.0 km/h, 50.0 min at 39.0 km/h, and 22.0 min at 40.0 km/h, and she spends 6.0 min eating lunch and buying gas.

(a) Determine the average speed for the trip.

km/h

(b) Determine the total distance traveled.

km

Solution:

$25\ \text{min} = \frac{25}{60}\ \text{h} = \frac{5}{12}$, $50\ \text{min} = \frac{50}{60}\ \text{h} = \frac{5}{6}\ \text{h}$, $22\ \text{min} = \frac{22}{60}\ \text{h} = \frac{11}{30}\ \text{h}$, $6\ \text{min} = \frac{6}{60}\ \text{h} = \frac{1}{10}\ \text{h}$.

The total time equals $t = 25 + 50 + 22 + 6 = 103\ \text{min} = \frac{103}{60}\ \text{h}$.

The distance equals speed multiplied by time.

Hence the total distance equals $S = 59 \cdot \frac{25}{60} + 39 \cdot \frac{50}{60} + 40 \cdot \frac{22}{60} + 0 \cdot \frac{6}{60} = 71.75\ \text{km}$.

The average speed equals total distance divided by total time.

Hence the average speed equals $v = \frac{71.75}{\frac{103}{60}} \approx 41.7961\ \text{km/h}$.

Answer: (a) $v = 41\frac{82}{103} \approx 41.7961\ \text{km/h}$. (b) $S = 71.75\ \text{km}$.