Sally travels by car from one city to another. She drives for 26.0 min at 77.0 km/h, 49.0 min at 47.0 km/h, and 51.0 min at 80.0 km/h, and she spends 8.0 min eating lunch and buying gas.

(a) Determine the average speed for the trip, km/h.

(b) Determine the total distance traveled.

Solution: a) Average speed of the trip can be calculated as the ratio of total traveled distance to the total time of travel: $v_a = \frac{d_\Sigma}{t_\Sigma} = \frac{\sum v_i \cdot t_i}{\sum t_i} = \frac{(26 \cdot 77 + 49 \cdot 47 + 51 \cdot 80 + 8 \cdot 0)/60}{(26 + 49 + 51 + 8)/60} = 62.57 \ \frac{\text{km}}{\text{h}};$

b) The total traveled distance can be calculated as product of average speed and total time of the travel:

$d_\Sigma = v_a \cdot t_\Sigma = 62.57 \cdot (26 + 49 + 51 + 8)/60 = 139.74 \ \text{km};$

Answer: a) 62.57 km/h; b) 139.74 km.