Wolff 2.9

a) Let D denote the total distance. Then we drive $D/2$ miles in the city and $D/2$ miles on the highways.

Consequently, we consume $(D/2)/20$ gallons of fuel in the city and $(D/2)/40$ gallons of fuel on the highways.

Thus, the average mileage, which is the total distance divided by the total fuel consumption, is given by

$$AM = D/(D/40 + D/80) = D/(3D/80) = 80/3.$$

b) There are several possible answers to this question. Some could be:

- You could argue that this would be equivalent with a case with constant and deterministic renewal intervals (distances in the city and on the highways).

- You could argue that the distances in the city and on the highways are random and this is a question of expectations.