Problem of the Week
Problem B and Solution
Let the Leaves Fall Where They May

Problem

Masha lives in a house on a forested lot. The trees are lovely, but in the fall there is a lot of raking that needs to be done.

It took him 10 minutes to rake and fill his first bag of leaves, which had a mass of 11 kg. Over the course of the fall, he collected 35 bags of leaves.

(a) If he assumes that each bag has the same mass as the first bag, what is the expected total mass of all the leaves he collected?

(b) If he assumes that his time to rake and fill each bag was the same as for the first bag, what is his total expected time to collect all the leaves?

It actually took him 8 hours to do all his raking, and according to the weigh scale at the Environmental Transfer Station, he had 425 kg of leaves in total.

(c) What was the actual mean (average) mass of each bag of leaves? Round your answer to the nearest tenth of a kg.

(d) What was the actual mean (average) time that it took for him to rake the leaves for each bag? Round your answer to the nearest minute.

(e) To Think About: Was predicting his raking workload based on his first bag a good approach?

Solution

(a) If he collected 35 bags that each weighed 11 kg, the total mass of leaves he collected was 35×11 kg $= 385$ kg.

(b) If he collected 35 bags and took 10 minutes to collect the leaves for each one, his total time would have been 35 bags $\times$ 10 min/bag $= 350$ minutes or 5 hours and 50 minutes.

(c) The actual mean mass of each bag was $\dfrac{425}{35} \approx 12.1$ kg.

(d) It took him 8 hours or $8 \times 60 = 480$ minutes to rake the 35 bags. The mean time was $\dfrac{480}{35} \approx 14$ min/bag, rounded to the nearest minute.

(e) Answers will vary. Estimating based on what you know is usually a good way to make predictions. He might have gotten a better estimate if he had used the first few bags, rather than just the first.