# MATHCOUNTS® Problem of the Week Archive

## *Autumn Leaves – October 24, 2022*

### *Problems & Solutions*

The Wilsons traveled to Shendandoah National Park to view the fall foliage at its peak. The driving time from their home to the park was 2 hours. For the first third of the time they spent driving to the park, the Wilsons were in traffic and averaged 42 mi/h. During the second third of the two hours, they were able to travel at an average speed of 66 mi/h. For the final third of their trip, the Wilsons traveled on local mountain roads and drove an average of 30 mi/h. What is the total distance the Wilsons traveled to get to the park from their home?

*The Wilson's 2-hour trip is divided into three 40-minute segments. During the first 40 minutes, they traveled at an average speed of 42 mi/h, or 42 miles every 60 minutes. We can use the proportion 42/60 = d/40, where d is the distance traveled. Cross-multiplying yields a distance traveled of 60d = 42(40) → 60d = 1680 → d = 28 mi. For the second segment, the Wilsons averaged 66 miles every 60 minutes. We can use the proportion 66/60 = d/40 to see that they traveled 60d = 66(40) → 60d = 2640 → d = 44 mi during the second segment of the trip. For the last segment of the trip, they averaged 30 miles every 60 minutes. We can use the proportion 30/60 = d/40 to determine that the Wilsons traveled 60d = 30(40) → 60d = 1200 → d = 20 mi. It follows that the Wilsons traveled a total of 28 + 44 + 20 =* ***92*** *miles to get to the park from their home.*

What was the average driving speed for the Wilson's entire trip from home to the park?

*The Wilsons traveled a total of 92 miles in 2 hours, which results in an average speed of 92/2 =* ***46*** *mi/h.*

The Wilsons traveled back home using the same route, for which the average speed limit was 60 mi/h. During their trip home, the Wilson's drove at an average speed that exceeded the average speed limit by 10%. How many minutes did it take the Wilson's to return home from the park? Express your answer to the nearest whole number.

*The average speed limit on the trip home was 60 mi/h, which is equivalent to 1 mile per minute. If the Wilson's average speed exceeded the average speed limit by 10%, it follows that their average speed was 1.1 × 1 = 1.1 miles per minute. From the previous problem, we know that the driving distance from the park to the Wilson's home is 92 miles. Dividing, we see that it took the Wilsons 92 ÷ 1.1 ≈* ***84*** *minutes to drive home.*

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