

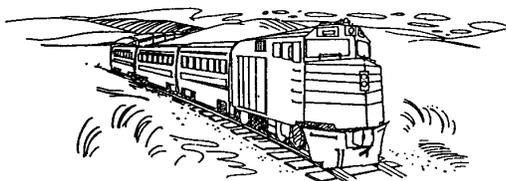
Name _____

Date _____

Miles of Words

This problem gives you the chance to

- *assess the reasonableness that forty thousand words were uttered in a 200-mile train journey*



The following excerpt appears on the first page of a fictitious novel:

“Alan sat next to an elderly man during his train ride to Penn Station. The two men sat side by side for the entire two-hundred mile trip. Over that distance Alan uttered about forty thousand words to the stranger. When the train stopped at Penn Station, the two men departed and they never saw each other again.”

1. Find a reasonable figure for the rate, in words per minute, of normal spoken language. Show all of your calculations and explain your reasoning.
2. Make an estimate of the average speed of a train in miles per hour.
3. Discuss in detail this statement:
“Over that distance Alan uttered about forty thousand words . . .”
Is this statement reasonable? Why or why not? Show all of your calculations and explain your reasoning.

High School Package 1



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A Sample Solution

Task

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1. There are about 60 words in the paragraph from the novel. Reading that excerpt aloud takes about 20 seconds, or $20 \div 60 \approx 0.33$ minutes. This is a rate of $60 \div 0.33 \approx 180$ words per minute. Any reasonable estimate close to this is acceptable.
2. Trains go fast (greater than 70 mi/hr), but also make stops. An estimate of 60 mi/hr as an average seems reasonable.
3. At a rate of 60 mi/hr, traveling 200 miles takes
 $200 \div 60 = 3\frac{1}{3}$ hours = $(3\frac{1}{3})(60)$ minutes = 200 minutes.
(Quicker: 60 mi/hr = 1 mi/min, so 200 miles requires 200 minutes.)

At a rate of 180 words per minute, the number of words in 200 minutes is $(180)(200) = 36,000$ words, assuming the person talked all the time.

This is not quite 40,000 words. So either the person talked faster, or the train went slower or had multiple stops, or the author exaggerated.

Miles of Words

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Using this Task

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The figuring in question 1 gives $T = \frac{D}{s}$, while the figuring in question 2 gives $N = rT$. Combining these gives the result $N = r\left(\frac{D}{s}\right)$. This expresses the number of words in terms of the rate of speed s , the rate of speech r , and the distance D . It can be used to see if the number of words (40,000) mentioned in the article is reasonable.

If it were presented in this straightforward way, the task would be simple and mechanical. But it is not presented in this way. To get to the “heart” of this task, students have to do some meaningful work. They need to make sense of a given written passage where the context is set, and they need to make reasonable estimates of the rate of speed of a train and the rate of normal speech. These estimates will become the “given” rates in the next stage of the task. In carrying out the heart of the task, students need to know (and know how to use) rate relationships such as “distance equals rate times time.” They also need to make appropriate unit conversions: the time T they find in question 1 will be in hours, and they will have to convert this to minutes before they can use it in question 2 where the rate is in “words per minute.”

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