

Math 025 Example of P.O.W.E.R. Problem Solving

The Problem

A bus traveled on a level road for 2 hours at an average speed of 20 mph faster than it traveled on a winding road. The time spent on the winding road was 3 hours. Find the average speed on the winding road if the total trip was 200 miles.

Perceive

What can I infer from this information?

From reading this problem I can infer that a bus has traveled at two different speeds. I don't know how fast it traveled on the winding road, but I do know that it traveled 20 mph faster on the level road. I know that the bus traveled 2 hours on the level road and three hours on the winding road. I also know that the total distance of the trip was 200 miles.

How does this problem compare to the examples in the section?

We have been studying uniform motion problems that have the basic equation $d=rt$ (distance is equal to rate times time).

What is the basic question in this problem?

The basic question asks me to find the average speed on the winding road.

Organize

Bus on the winding road:

The rate is unknown, x , time it traveled is 3 hours, and the distance is equal to rate times time, $3x$.

Bus on the level road:

The rate is 20 mph faster than the rate on the winding road, $x+20$, the time it traveled is 2 hours, and the distance is equal to rate times time, $2(x+20)$.

The total distance traveled was 200 miles.

Work the problem

$$3x + 2(x+20)=200$$

$$5x + 40 = 200$$

$$5x = 160$$

$$x = 32 \text{ mph}$$

Examine

Since x was the rate of the bus on the winding road. This answers the basic question: the bus traveled 32 mph on the winding road. Does this make sense? Well, if you travel at 32 mph for 3 hours, you travel 96 miles, and if you travel at 52 mph for two hours, then you travel 104 miles. That makes a total of 200 miles! Yes, it makes perfect sense.

Review

This problem used the uniform motion equation, $d = rt$. It required me to know that faster than and total meant to add. I could answer other questions about this problem such as: How far did the bus travel on the winding road?, How far did it travel on the level road?, or How fast was it traveling on the level road?