

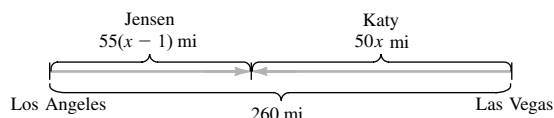
2.21

Word Problem on Linear Equations: Problem Type 2

• Example 1

Katy leaves Las Vegas for Los Angeles at 10 AM, driving at 50 mi/h. At 11 AM Jensen leaves Los Angeles for Las Vegas, driving at 55 mi/h along the same route. If the cities are 260 mi apart, at what time will they meet?

Note that when Katy and Jensen meet, the sum of the distances that they have travelled is exactly 260 mi. You can follow the argument using the graph below.



Suppose that Katy drives x hours to meet Jensen. When they meet, Katy will have driven $50x$ mi. Since Jensen leaves Los Angeles one hour after Katy leaves Las Vegas, Jensen will have travelled for $(x - 1)$ hours. Thus, Jensen will have travelled $55(x - 1)$ mi to meet Katy.

To sum up:

Distance travelled by Katy: $50x$ mi

Distance travelled by Jensen: $55(x - 1)$ mi

We must have

$$50x + 55(x - 1) = 260$$

$$50x + 55x - 55 = 260$$

$$105x - 55 = 260$$

$$105x = 315$$

$$x = 3$$

Thus, Katy and Jensen will meet 3 hours after Katy leaves Las Vegas, that is, at 1 PM.

• • • CHECK YOURSELF 1

At noon a jogger leaves one point, running at 8 mi/h. One hour later a bicyclist leaves the same point, traveling at 20 mi/h in the opposite direction. At what time will they be 36 mi apart?

• • • CHECK YOURSELF ANSWER

1. At 2 PM.

2.21 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Solve the following word problems. Be sure to show the equation you use for the solution.

1. Driving speed. A car leaves a city at 2 PM and goes north at a rate of 50 mi/h. One hour later a second car leaves, traveling south at a rate of 40 mi/h. At what time will the two cars be 320 mi apart?

2. Bus distance. A bus leaves a station at 1 PM, traveling west at an average rate of 44 mi/h. One hour later a second bus leaves the same station, traveling east at a rate of 48 mi/h. At what time will the two buses be 274 mi apart?

3. Traveling time. At 8:00 AM, Catherine leaves on a trip at 45 mi/h. One hour later, Max decides to join her and leaves along the same route, traveling at 54 mi/h. When will Max catch up with Catherine?

4. Bicycling time. Martina leaves home at 9 AM, bicycling at a rate of 24 mi/h. Two hours later, John leaves, driving at the rate of 48 mi/h. At what time will John catch up with Martina?

5. Traveling time. Mika leaves Boston for Baltimore at 10:00 AM, traveling at 45 mi/h. One hour later, Hiroko leaves Baltimore for Boston on the same route, traveling at 50 mi/h. If the two cities are 425 mi apart, when will Mika and Hiroko meet?

6. Traveling time. A train leaves town A for town B, traveling at 35 mi/h. At the same time, a second train leaves town B for town A at 45 mi/h. If the two towns are 320 mi apart, how long will it take for the two trains to meet?