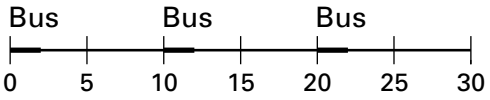
CHAPTER 12, LESSON 3, EXTRA EXAMPLE

Extra Example 5 Using Length to Find Probability

A bus arrives at your stop on the hour every hour and every 10 minutes after that. The bus waits 2 minutes before leaving. Suppose that you arrive at the stop at a random time between 8:00 A.M. and 8:30 A.M. What is the probability that there is a bus at the stop?

SOLUTION

You can think of the half hour from 8:00 to 8:30 as a number line from 0 to 30. Each period of time for which a bus is at the stop can be represented by a segment 2 units long.



If a bus stops on the hour every hour and every 10 minutes after that then waits 2 minutes before leaving, it must arrive at 8:00, 8:10, and 8:20 and leave at 8:02, 8:12 and 8:22. The probability that a bus is at the stop between 8:00 AM and 8:30 AM is:

$$P(\text{bus is at the stop}) = \frac{\text{total time where bus is at stop}}{\text{total time at stop}}$$

$$= \frac{(2-0)+(12-10)+(22-20)}{30-0} = \frac{6}{30} = 0.2$$

▶ The probability that a bus is at the bus stop from 8:00 AM to 8:30 AM is 0.20.