

**EXAMPLE 3 Find the probability of A and B**

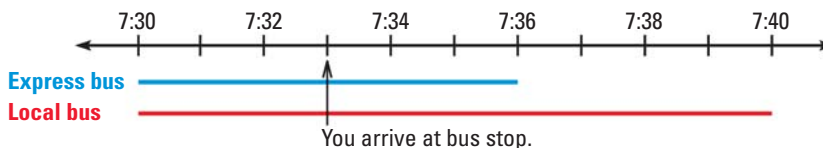
**BUS SCHEDULE** You take a city bus from your neighborhood to a location within walking distance of your school. The express bus arrives at your neighborhood between 7:30 and 7:36. The local bus arrives at your neighborhood between 7:30 and 7:40. You arrive at the bus stop at 7:33. Find the probability that you have missed both the express bus and the local bus.

**ANOTHER WAY**

For alternative methods for solving the problem in Example 3, turn to page 868 for the **Problem Solving Workshop**.

**Solution**

The events are independent. The arrival of one bus does not affect the arrival of the other bus.



There are 6 minutes when the express bus can arrive. You are not at the bus stop for 3 of those minutes.

$$P(\text{you miss express bus}) = \frac{3}{6} = \frac{1}{2}$$

There are 10 minutes when the local bus can arrive. You are not at the bus stop for 3 of those minutes.

$$P(\text{you miss local bus}) = \frac{3}{10}$$

Multiply the probabilities of the two events:

$$P(\text{you miss both buses}) = \frac{1}{2} \cdot \frac{3}{10} = \frac{3}{20}$$

► The probability that you miss the express bus and the local bus is  $\frac{3}{20}$ .

**EXAMPLE 4 Find the probability of A and B**

**PEN COLORS** A box contains 3 blue pens and 5 black pens. You choose one pen at random, do not replace it, then choose a second pen at random. What is the probability that both pens are blue?

**Solution**

Because you do not replace the first pen, the events are dependent. Before you choose a pen, there are 8 pens, and 3 of them are blue. After you choose a blue pen, there are 7 pens left and 2 of them are blue.

$$\begin{aligned} P(\text{blue and then blue}) &= P(\text{blue}) \cdot P(\text{blue given blue}) \\ &= \frac{3}{8} \cdot \frac{2}{7} = \frac{6}{56} = \frac{3}{28} \end{aligned}$$

**GUIDED PRACTICE for Examples 3 and 4**

3. **MARBLES** A bag contains 4 red, 5 green, and 2 blue marbles. You randomly draw 2 marbles, one at a time. Find the probability that both are red if:
- you replace the first marble.
  - you do not replace the first marble.