

11-4

Practice

Form G

Conditional Probability

Use the table at the right to find each probability.

Education and Salary of Employees

| | Under \$20,000 | \$20,000 to \$30,000 | Over \$30,000 |
|-----------------------|----------------|----------------------|---------------|
| Less than high school | 69 | 36 | 2 |
| High school | 112 | 98 | 14 |
| Some college | 102 | 193 | 143 |
| College degree | 13 | 178 | 245 |

- $P(\text{has less than high school education})$ **8.9%**
- $P(\text{earns over } \$30,000 \text{ and has less than high school education})$ **0.2%**
- $P(\text{earns over } \$30,000 \mid \text{has only high school education})$ **6.25%**
- $P(\text{has high school education or less} \mid \text{earns over } \$30,000)$ **4%**

Use the table below to find each probability. The table gives information about students at one school.

Favorite Leisure Activities

| | Sports | Hiking | Reading | Phoning | Shopping | Other |
|--------|--------|--------|---------|---------|----------|-------|
| Female | 39 | 48 | 85 | 62 | 71 | 29 |
| Male | 67 | 58 | 76 | 54 | 68 | 39 |

- $P(\text{sports} \mid \text{female})$ **11.7%**
 - $P(\text{female} \mid \text{sports})$ **36.8%**
 - $P(\text{reading} \mid \text{male})$ **21%**
 - $P(\text{male} \mid \text{reading})$ **47.2%**
 - $P(\text{hiking} \mid \text{female})$ **14.4%**
 - $P(\text{hiking} \mid \text{male})$ **16%**
 - $P(\text{male} \mid \text{shopping})$ **48.9%**
 - $P(\text{female} \mid \text{shopping})$ **51.1%**
13. The senior class is 55% female, and 32% of the class are females who play a competitive sport. What is the probability that a student plays a competitive sport, given that the student is female? **58.2%**

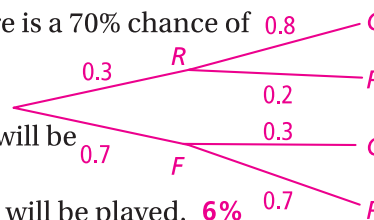
14. A softball game has an 80% chance of being cancelled if it rains and a 30% chance of being cancelled if there is fog when there is no rain. There is a 70% chance of fog with no rain and a 30% chance of rain.

a. Make a tree diagram based on the information above.

b. Find the probability that there will be fog and the game will be cancelled. **21%**

c. Find the probability that there will be rain and the game will be played. **6%**

d. Find the probability that the game will be cancelled. **45%**



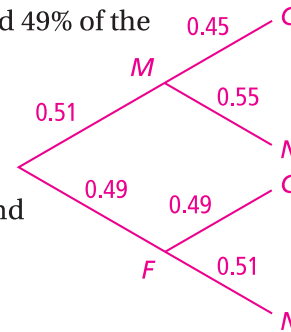
11-4 Practice (continued)

Conditional Probability

Form G

15. The population of a high school is 51% male. 45% of the males and 49% of the females attend concerts.

- Make a tree diagram based on the information above.
- Find the probability that a student is male and attends concerts. **about 23%**
- Find the probability that a student is female and does not attend concerts. **about 25%**
- Find the probability that a student attends concerts. **about 47%**



16. **Reasoning** A student says that if $P(A) = P(A | B)$, then A and B must be independent events. Is the student correct? Explain.

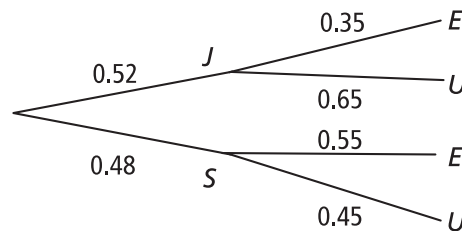
Yes; if A and B are independent, then the probability of A will be the same whether or not B occurs.

17. A school's colors are blue and gold. At a pep rally, 65% of the students are wearing both blue and gold, and 90% of the students are wearing blue.

- What percent of students wearing blue are also wearing gold? **72%**
- Writing** Describe how a tree diagram could help you solve this problem.

Answers may vary. Sample: A tree diagram can help me determine $P(B)$ and $P(B \text{ and } G)$ so that I can use the formula for conditional probability.

You survey a group of juniors and seniors. The tree diagram relates student's class and whether a student is employed after school. Find each probability. Let J , S , E , and U represent junior, senior, employed, and unemployed, respectively.



18. $P(E)$ **44.6%**

19. $P(J \text{ and } U)$ **33.8%**

20. $P(S | E)$ **59.2%**

21. $P(J | U)$ **61%**

22. $P(S | U)$ **39.0%**

23. $P(J | E)$ **40.8%**