

Name: _____

Date: _____

UNIT 4 • APPLICATIONS OF PROBABILITY

Lesson 2: Conditional Probability

Practice 4.2.2: Using Two-Way Frequency Tables

A survey was conducted of 20 baseball players. They were asked to choose infield, outfield, pitcher, or catcher as their favorite position. They were also asked whether they throw with their right arm or left arm. The table shows the survey results with the players numbered 1–20. Use the table to complete problems 1 and 2.

| Player | Favorite position | Throwing arm | Player | Favorite position | Throwing arm |
|--------|-------------------|--------------|--------|-------------------|--------------|
| 1 | OF | R | 11 | P | R |
| 2 | P | R | 12 | OF | R |
| 3 | IF | R | 13 | IF | R |
| 4 | C | R | 14 | IF | R |
| 5 | IF | L | 15 | P | L |
| 6 | C | R | 16 | OF | L |
| 7 | IF | R | 17 | IF | R |
| 8 | OF | R | 18 | P | L |
| 9 | OF | R | 19 | IF | R |
| 10 | P | R | 20 | OF | R |

Key: IF = Infield, OF = Outfield, P = Pitcher, C = Catcher, R = Right, L = Left

1. Set up and complete a tally table for the data.

2. Use your tally table to construct a two-way frequency table that summarizes the data.

continued

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Eastern High School's highest academic award category is Highest Honors. The next highest award is Academic Excellence. The table shows data about the awards by grade. Use the table and the events that follow to complete problems 3–6.

| Grade | Award category | |
|-----------|----------------|---------------------|
| | Highest Honors | Academic Excellence |
| 10 | 36 | 44 |
| 11 | 32 | 43 |
| 12 | 30 | 40 |

TEN: A recognized student is in the tenth grade.

TWELVE: A recognized student is in the twelfth grade.

HH: A recognized student received the Highest Honors award.

AE: A recognized student received the Academic Excellence award.

3. Compare $P(TEN|HH)$ and $P(HH|TEN)$. Interpret what your answer means.
4. Are *TEN* and *HH* independent? Explain your reasoning and what your answer means.
5. Compare $P(TWELVE|AE)$ and $P(AE|TWELVE)$. Interpret what your answer means.
6. Are *TWELVE* and *AE* independent? Explain your reasoning and interpret what your answer means.

continued

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A cafeteria manager recorded the choices of 200 students who each chose one food item and one beverage. The table shows the data. Use the table and the events that follow to complete problems 7–10.

| Beverage choice | Food choice | | | |
|-----------------|-------------|--------------|-----------------|-------|
| | Pizza | Cold-cut sub | Chicken tenders | Salad |
| Juice | 39 | 25 | 26 | 9 |
| Milk | 11 | 24 | 25 | 41 |

J : The student chooses juice.

M : The student chooses milk.

P : The student chooses pizza.

CC : The student chooses a cold-cut sub.

CT : The student chooses chicken tenders.

S : The student chooses salad.

7. Compare $P(J|P)$ and $P(P|J)$. Determine if J and P are independent. Show the numerical values of all the probabilities used in your answers.
8. Compare $P(J|CT)$ and $P(CT|J)$. Determine if J and CT are independent. Show the numerical values of all the probabilities used in your answers.
9. Compare $P(M|CC)$ and $P(CC|M)$. Determine if M and CC are independent. Show the numerical values of all the probabilities used in your answers.
10. Compare $P(M|S)$ and $P(S|M)$. Determine if M and S are independent. Show the numerical values of all the probabilities used in your answers.