**Probability and Paper Wads**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Made Shot | Missed Shot | Total |
| Males |  |  |  |
| Females |  |  |  |
| Total |  |  |  |

1. What is the probability that a shot was made?

P(shot made) =

1. What is the probability that a shot was taken by a female?

P(female) =

1. What is the probability a shot was made and the shooter was a female?

P(shot made and female) =

1. What is the probability a shot was made or the shooter was a female?

P(shot made or female) =

1. Given that a shot was made, what is the probability the shooter was male?

P(male/shot made) =

1. Are making a shot and being male independent? Test for independence: P(A) = P (A/B).
2. Assuming the probabilities above remain true for future shots and are independent, what is the probability two shots in a row both land in the wastebasket?

P ( 2 shots made) =

**Example 1**: Four friends cleaning out their math folders were too lazy to get up and throw the papers in the trash. Instead, they sat at their desks and took shots at the wastebasket. Together they took a total of 188 shots. Only 89 of the shots actually made it in the wastebasket, and of those that went in 32 of them hit the rim before going into the basket. Sixty-four shots missed the rim and the wastebasket completely.

1. How many shots hit the rim but did not go in the wastebasket?
2. What is the probability a shot hit the rim but did not go in the wastebasket?

P( shot hit the rim and did not go into wastebasket) =

1. What is the probability a shot went in the basket?

P(shot made) =

1. What is the probability a shot went in if the shot hit the rim?

P(shot made/hit rim) =

 **Example 2:** The probability Michael makes a shot from his desk into the wastebasket is 0.6.

1. What is the probability Michael shoots and misses?

P(Michael misses the shot) =

1. What is the probability Michael makes 3 shots in a row if the shots are independent?

P(Michael makes 3 shots in a row) =

1. What is the probability Michael misses his first 3 shots and makes his fourth shot?

P(no basket until the fourth shot) =

**Example 3**: A group of students was recently polled about the technology they own.

69 own a cell phone

45 own a computer

23 own an ipod

4 do not own any of the above three items

34 own a cell phone but not a computer nor an ipod.

6 own all three, a computer, an ipod, and a cell phone

8 own a cell phone and an ipod but not a computer

2 own only an ipod

1. How many students were polled?
2. What is the probability a randomly selected polled student owns a computer?
3. What is the probability a computer owner also owns an ipod?
4. What is the probability a randomly selected polled student owns an ipod or a cell phone?
5. What is the probability a randomly selected polled student owns an ipod and a cell phone?

**Optional Example 4**: Computers, fine arts, ecomomics – this one requires using a systems of equations

 There are 500 seniors 180 are taking fine arts

 210 are enrolled in computers 36 taking only economics and computers

 80 do not need any of the 3 10 taking only fine arts and computers

 80 are taking only fine arts 220 taking economics

Find:

1. P(only taking economics)
2. P (economics and fine arts)
3. P (taking all 3 classes)