ALBERT

Name _____ Date _____

Conditional Probability in Everyday Situations Worksheet

Geometry · Common Core HSS-CP.A.5

> Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Practice

Builds the skill step by step.

1. Which notation means "the probability a student is late, given that it is raining"?
   A. P(late or rain)
   B. P(late | rain)
   C. P(late and rain)
   D. P(rain | late)

2. Of people who exercise regularly, 80% sleep well. What is P(sleeps well | exercises)?

   _____

   _____

3. Which pair of events is most likely independent?
   A. two separate flips of a fair coin
   B. rain and carrying an umbrella
   C. studying and passing a test
   D. cold weather and wearing a coat

4. Which pair of events is most likely dependent?
   A. two separate coin flips
   B. rolling a 6 and flipping heads
   C. drawing a card, replacing it and drawing again
   D. rain and carrying an umbrella

5. 20 of the 25 students who studied passed the test. What is P(passed | studied)?

6. "The probability a person has a cold, given that they are sneezing." Which is it?
   A. P(cold) × P(sneezing)
   B. P(cold and sneezing)
   C. P(cold | sneezing)
   D. P(sneezing | cold)

7. 60% of all students bike to school, and 60% of girls bike to school. What does this suggest?
   A. Girls bike more than boys.
   B. Biking depends on being a girl.
   C. No one walks.
   D. Biking and being a girl are independent.

8. P(alarm sounds | fire) = 0.95. What does this mean?
   A. When there is a fire, the alarm sounds 95% of the time.
   B. When the alarm sounds, there is a fire 95% of the time.
   C. 95% of days have fires.
   D. The alarm sounds 95% of the time.

9. Of 50 dog owners, 15 also own a cat. What is P(owns a cat | owns a dog)?

10. 40% of students buy lunch on a normal day, but 70% buy lunch on pizza day. What does this show?
    A. Most students never buy lunch.
    B. Buying lunch depends on whether it is pizza day.
    C. Pizza day is rare.
    D. Buying lunch is independent of pizza day.

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On Level

Grade-level practice.

1. For a medical test, how do P(positive | disease) and P(disease | positive) differ?
   A. The first is always smaller.
   B. They mean the same thing.
   C. The first is about people who have the disease; the second is about people who tested positive.
   D. They are always equal.

2. P(rain) = 0.3, but P(rain | cloudy morning) = 0.6. Are rain and a cloudy morning independent?
   A. No: a cloudy morning doubles the chance of rain.
   B. Yes: 0.3 and 0.6 are both less than 1.
   C. Yes: weather is random.
   D. You can't tell.

3. 30% of students take Spanish, and 40% of Spanish students also take French. What is P(Spanish and French)?

4. At a store, P(buys bread) = 0.5 and P(buys bread and butter) = 0.2. What is P(buys butter | buys bread)?

5. Explain in everyday language why P(carries umbrella | raining) is different from P(carries umbrella).

6. Overall, 5% of drivers have an accident in a year, but 15% of drivers under 25 do. How many times as likely is a driver under 25 to have an accident?

7. P(late | takes the bus) = P(late). What does that mean?

   A. The bus is late half the time.

   B. Taking the bus doesn't change the chance of being late.

   C. Everyone who takes the bus is late.

   D. No one who takes the bus is late.

8. Of 200 people, 120 like summer best, and 90 of those 120 love swimming. What is P(loves swimming | likes summer best)?

9. Factory A makes 60% of a company's parts, and 2% of Factory A's parts are defective. What is P(a part is from A and defective)?

10. In a family, each child is equally likely to be a girl or a boy, independently. The first child is a girl. What is P(second child is a girl)?

    A. $\frac{1}{2}$

    B. $\frac{1}{4}$

    C. $\frac{3}{4}$

    D. 1

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Challenge

Multi-step and word problems that stretch it.

1. 1% of people have a condition. A test is positive for 99% of people with it and for 5% of people without it. Out of 10,000 people, what is P(has the condition | tests positive)?

2. In that situation (10,000 people; 1% have the condition; 99% and 5% positive rates), how many people test positive?

3. Why is P(condition | positive) so low in that example even though the test is accurate?

   A. Only 1% of people get tested.

   B. P(positive | condition) is low.

   C. The condition is rare, so most positive results come from the many people without it.

   D. The test is broken.

4. P(late) = 0.2, P(traffic) = 0.3 and P(late | traffic) = 0.5. What is P(late and traffic)?

5. With those numbers (P(late) = 0.2, P(late and traffic) = 0.15), what is P(traffic | late)?

6. Explain why P(rain | clouds) is not the same as P(clouds | rain).

7. A survey of 500 people has 300 adults and 200 teens. 180 adults and 140 teens use an app. How much greater is P(uses app | teen) than P(uses app | adult)?

8. In that survey, are using the app and being a teen independent?

   A. No: P(app | teen) = 0.7 but P(app) = 0.64.

   B. Yes: both groups use the app.

   C. Yes: 140 < 180.

   D. You can't tell.

9. A team wins 70% of home games and 40% of away games. Half its games are at home. What is P(win)?

10. For that team, what is P(home game | win)?