Conditional Probability Worksheet

Geometry · Common Core HSS-CP.A.3

> Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

Practice

Builds the skill step by step.

1. P(A and B) = 0.12 and P(B) = 0.4. What is P(A | B)?

2. P(A and B) = 0.1 and P(A) = 0.5. What is P(B | A)?

3. What does P(A | B) mean?

   A. the probability of B, given that A has happened

   B. the probability of A, given that B has happened

   C. the probability of A or B

   D. the probability of A divided by B

4. A number cube is rolled. What is P(6 | even)?

5. A number cube is rolled. What is P(even | greater than 3)?

6. A and B are independent and P(A) = 0.3. What is P(A | B)?

7. $P(A \mid B) = 0.5$ and $P(B) = 0.4$. What is $P(A \text{ and } B)$?

8. A card is drawn from a standard 52-card deck. What is P(king | face card)?

9. A card is drawn from a standard 52-card deck. What is P(heart | red)?

10. If $P(A \mid B) = P(A)$, what can you conclude?

    A. A and B are independent.

    B. A and B are mutually exclusive.

    C. $P(B) = 0$.

    D. A always happens.

ALBERT

Name _____ Date _____

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On Level

Grade-level practice.

1. The table shows 200 students by grade and whether they have a car. What is P(senior | has a car)?

	Juniors	Seniors	Total
Has a car	30	50	80
No car	70	50	120
Total	100	100	200

2. The table shows 200 students by grade and whether they have a car. What is P(has a car | senior)?

	Juniors	Seniors	Total
Has a car	30	50	80
No car	70	50	120
Total	100	100	200

3. The table shows 200 students by grade and whether they have a car. What is P(has a car | junior)?

	Juniors	Seniors	Total
Has a car	30	50	80
No car	70	50	120
Total	100	100	200

4. The table shows 200 students by grade and whether they have a car. Are having a car and being a senior independent?

	Juniors	Seniors	Total
Has a car	30	50	80
No car	70	50	120
Total	100	100	200

A. No: P(car | senior) = $\frac{1}{2}$ but P(car) = $\frac{2}{5}$.

B. Yes: there are 100 juniors and 100 seniors.

C. Yes: 50 seniors have cars and 50 don't.

D. You can't tell.

5. The table shows 100 households by pet ownership. What is P(owns a cat | owns a dog)?

	Owns a cat	No cat	Total
Owns a dog	12	18	30
No dog	28	42	70
Total	40	60	100

6. Two number cubes are rolled. What is P(sum is 8 | first cube is 3)?

7. Two number cubes are rolled. What is P(first cube is 3 | sum is 8)?

8. P(A) = 0.5, P(B) = 0.6 and P(A and B) = 0.3. What is P(B | A)?

9. Explain why P(A | B) = P(A) means A and B are independent.

10. P(A | B) = 0.25 and P(A and B) = 0.05. What is P(B)?

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Challenge

Multi-step and word problems that stretch it.

1. P(A) = 0.4, P(B) = 0.5 and P(A or B) = 0.7. What is P(A | B)?

2. For those events (P(A) = 0.4, P(B) = 0.5, P(A or B) = 0.7), are A and B independent?

   A. Yes: P(A | B) = 0.4 = P(A).

   B. No: 0.4 ≠ 0.5.

   C. No: P(A or B) < 1.

   D. You can't tell.

3. Two coins are flipped. What is P(both heads | at least one head)?

4. Three coins are flipped. What is P(exactly two heads | the first coin is heads)?

5. A family has two children. Each is equally likely to be a girl or a boy. What is P(both girls | the older child is a girl)?

6. 2% of people have a disease, and 90% of people with it test positive. What is P(has the disease and tests positive)?

7. $P(A \mid B) = 0.6$, $P(B \mid A) = 0.4$ and $P(A) = 0.3$. What is $P(B)$?

8. Two cards are drawn without replacement from a standard 52-card deck. What is P(second is an ace | first is an ace)?

9. A number cube is rolled. What is P(prime | odd)?

10. In general, how do $P(A \mid B)$ and $P(B \mid A)$ compare?

    A. They are usually different.

    B. They are always equal.

    C. $P(A \mid B)$ is always larger.

    D. They always add to 1.