LESSON MAKER PRO

Chance Chain

Multiply probabilities for independent events.

GRADE 8 · 8.PS.1.c

8.PS.1.c "Determine the probability of two independent events."

NAME _____ DATE _____

THE MULTIPLICATION RULE

When two events are independent, one event does not change the chance of the other event. To find the probability that both events happen, multiply their probabilities and simplify the product.

WORKED EXAMPLE

Events A and B are independent. P(A) = 4/11 and P(B) = 3/7. Find P(A and B).

1. P(A and B) = 4/11 x 3/7.
2. Multiply the numerators: 4 x 3 = 12.
3. Multiply the denominators: 11 x 7 = 77.
4. The fraction 12/77 is already simplified.

Answer: 12/77

PRACTICE 6 problems

1 Events A and B are independent. P(A) = 1/2 and P(B) = 1/8. Find P(A and B).

ANSWER _____

2 Events A and B are independent. P(A) = 5/8 and P(B) = 1/2. Find P(A and B).

ANSWER _____

3 Events A and B are independent. P(A) = 2/9 and P(B) = 1/5. Find P(A and B).

ANSWER _____

4 A bag contains colored tiles. You pick a tile, replace it, and pick again. The probability of picking a silver tile first is 5/12. The probability of picking a gold tile second is 1/6. What is the probability of both picks?

ANSWER _____

5 Events A and B are independent. P(A) = 8/13 and P(B) = 10/17. Find P(A and B).

ANSWER _____

6 Events A and B are independent. P(A) = 9/10 and P(B) = 2/5. Find P(A and B).

ANSWER _____

APPLY IT Show your work

1 In a video game, the chance that a randomly assigned quest is a stealth quest is 2/15. Independently, the chance that a reward chest contains a costume item is 5/8. What is the probability that a player gets both a stealth quest and a costume item?

WORK SPACE

ANSWER _____

2 A music app has a 5/13 chance of suggesting an artist that a student follows. Independently, it has a 1/8 chance of showing a ticket discount. What is the probability that the app does both?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two independent events have P(A) = 5/8. You know that P(A and B) = 5/16. What is P(B)? Explain why.

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ANSWER KEY

Chance Chain

GRADE 8 · 8.PS.1.c

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Events A and B are independent. P(A) = 1/2 and P(B) = 1/8. Find P(A and B).	**1/16**
2	Events A and B are independent. P(A) = 5/8 and P(B) = 1/2. Find P(A and B).	**5/16**
3	Events A and B are independent. P(A) = 2/9 and P(B) = 1/5. Find P(A and B).	**2/45**
4	A bag contains colored tiles. You pick a tile, replace it, and pick again. The probability of picking a silver tile first is 5/12. The probability of picking a gold tile second is 1/6. What is the probability of both picks?	**5/72**
5	Events A and B are independent. P(A) = 8/13 and P(B) = 10/17. Find P(A and B).	**80/221**
6	Events A and B are independent. P(A) = 9/10 and P(B) = 2/5. Find P(A and B).	**9/25**

PART 2 · APPLY IT

1. **1/12** Multiply 2/15 x 5/8 = 10/120. Simplify 10/120 to 1/12.
2. **5/104** Multiply 5/13 x 1/8 = 5/104. The fraction is already simplified.

CHALLENGE

1/2. Since P(A and B) = P(A) x P(B), P(B) = 5/16 ÷ 5/8 = 1/2.

Accept equivalent fractions only if they equal the simplified answers. For the challenge, students should divide the probability of both events by P(A) and explain that the events are independent.