LESSON MAKER PRO

Chance Connections

Test whether two events affect each other.

GRADE 8 · 8A.DSP.G

8A.DSP.G "Two events are independent if the occurrence of one event does not affect the probability of the other event. Determining whether two events are independent can be used for finding and understanding probabilities."

NAME _____ DATE _____

THE INDEPENDENCE TEST

Two events are independent when one does not change the chance of the other. To test them, compare P(A and B) with P(A) × P(B). If the values match, the events are independent.

WORKED EXAMPLE

A student is picked at random from this poll. Are taking the bus and choosing music independent?

STUDENT POLL

	Chose music	Chose sports
Takes the bus	14	21
Does not take the bus	10	15

1. There are 60 students. P(bus) = 35/60 and P(music) = 24/60.
2. P(bus and music) = 14/60 = 7/30.
3. 35/60 × 24/60 = 7/30, which matches.

Answer: Yes, the events are independent.

PRACTICE 4 problems

1 P(A) = 1/2, P(B) = 1/3, and P(A and B) = 1/6. Are A and B independent? Show your comparison.

ANSWER _____

2 P(C) = 1/4, P(D) = 1/2, and P(C and D) = 1/4. Are C and D independent? Show your comparison.

ANSWER _____

3 E and F are independent. P(E) = 2/3 and P(F) = 3/5. Find P(E and F).

ANSWER _____

4 P(G) = 3/4, P(H) = 2/5, and P(G and H) = 1/5. Are G and H independent? Show your comparison.

ANSWER _____

APPLY IT Show your work

1 A student is picked at random from this survey. Find P(on a team and chose pop). Are the events independent?

MUSIC SURVEY

	Chose pop	Chose other music
On a team	9	6
Not on a team	12	8

ANSWER _____

2 You flip a coin while an app randomly picks 1 of 5 songs. One song is your favorite. Are getting heads and picking your favorite independent? Find P(both).

WORK SPACE

ANSWER _____

CHALLENGE One step up

P(A) = 3/5, P(B) = 1/4, and P(A and B) = 3/20. Are A and B independent? Find the probability that neither happens. Explain your reasoning.

WORK SPACE AND ANSWER

Chance Connections

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	P(A) = 1/2, P(B) = 1/3, and P(A and B) = 1/6. Are A and B independent? Show your comparison.	**Yes. 1/2 × 1/3 = 1/6.**
2	P(C) = 1/4, P(D) = 1/2, and P(C and D) = 1/4. Are C and D independent? Show your comparison.	**No. 1/4 × 1/2 = 1/8, not 1/4.**
3	E and F are independent. P(E) = 2/3 and P(F) = 3/5. Find P(E and F).	**2/5**
4	P(G) = 3/4, P(H) = 2/5, and P(G and H) = 1/5. Are G and H independent? Show your comparison.	**No. 3/4 × 2/5 = 3/10, not 1/5.**

PART 2 · APPLY IT

1. **9/35; yes, independent.** There are 35 students. P(on a team) × P(chose pop) = 15/35 × 21/35 = 9/35, matching the 9 students in both groups.
2. **Yes; P(both) = 1/10.** The coin cannot affect the app's pick, so the events are independent. Multiply 1/2 × 1/5 = 1/10.

CHALLENGE

Yes. 3/5 × 1/4 = 3/20. P(neither) = 1 − 3/5 − 1/4 + 3/20 = 3/10.

Accept equivalent fractions. For independence decisions, look for a comparison of the joint probability with the product of the two individual probabilities.