LESSON MAKER PRO

Chance Check

Test whether one event changes the chance of another.

GRADE 8 · 8A.DSP.G.44

8A.DSP.G.44 "Explain whether two events, A and B, are independent, using two-way tables or tree diagrams."

NAME _____ DATE _____

THE INDEPENDENCE TEST

Two events are independent if knowing one happened does not change the chance of the other. In a table, compare a chance within one row with the chance for everyone, or check whether P(A and B) = P(A) × P(B).

WORKED EXAMPLE

Are choosing music and riding the bus independent?

STUDENTS' CHOICES

	Music	Other	Total
Bus	7	14	21
Walk	21	42	63
Total	28	56	84

1. Among bus riders, P(music) = 7/21 = 1/3.
2. Among all students, P(music) = 28/84 = 1/3.
3. The chances match.

Answer: Yes, the events are independent.

PRACTICE 4 problems

1 P(A) = 1/2, P(B) = 1/4, and P(A and B) = 1/8. Are A and B independent? Show the product.

ANSWER _____

2 P(A) = 2/5, P(B) = 3/8, and P(A and B) = 1/5. Are A and B independent? Show the product.

ANSWER _____

3 P(A) = 3/5, P(B) = 1/2, and P(A and B) = 3/10. Are A and B independent? Show the product.

ANSWER _____

4 P(A) = 3/4, P(B) = 2/5, and P(A and B) = 1/4. Are A and B independent? Show the product.

ANSWER _____

APPLY IT Show your work

1 At game night, is choosing a puzzle independent of arriving with a friend? Compare the chances.

GAME NIGHT CHOICES

	Puzzle	Other	Total
With friend	8	12	20
Without friend	12	18	30
Total	20	30	50

ANSWER _____

2 At a movie vote, is choosing comedy independent of attending with a sibling? Compare the chances.

MOVIE VOTES

	Comedy	Other	Total
With sibling	9	11	20
Without sibling	6	24	30
Total	15	35	50

ANSWER _____

CHALLENGE One step up

At an arcade, what value of x makes choosing a racing game independent of arriving with a friend? Explain.

ARCADE CHOICES

	Racing	Other
With friend	5	5
Without friend	8	x

WORK SPACE AND ANSWER

ANSWER KEY

Chance Check

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	P(A) = 1/2, P(B) = 1/4, and P(A and B) = 1/8. Are A and B independent? Show the product.	**Yes. 1/2 × 1/4 = 1/8.**
2	P(A) = 2/5, P(B) = 3/8, and P(A and B) = 1/5. Are A and B independent? Show the product.	**No. 2/5 × 3/8 = 3/20, not 1/5.**
3	P(A) = 3/5, P(B) = 1/2, and P(A and B) = 3/10. Are A and B independent? Show the product.	**Yes. 3/5 × 1/2 = 3/10.**
4	P(A) = 3/4, P(B) = 2/5, and P(A and B) = 1/4. Are A and B independent? Show the product.	**No. 3/4 × 2/5 = 3/10, not 1/4.**

PART 2 · APPLY IT

1. **Yes. 8/20 = 20/50 = 2/5.** Compare the chance of choosing a puzzle among students who arrived with a friend with the chance among all students.
2. **No. 9/20 is not equal to 15/50.** Compare the comedy vote rate for students with a sibling, 9/20, with the overall rate, 15/50 = 3/10.

CHALLENGE

x = 8. The racing game rate with a friend is 5/10 = 1/2, so the rate without a friend must also be 1/2. That requires 8 racing choices and 8 other choices.

Accept equivalent fractions or a correct comparison of conditional rates. For the challenge, accept any valid explanation showing that x = 8 makes the rates equal.