

MAT.08.ER.3.000SP.B.134 Claim 3

Sample Item ID:	MAT.08.ER.3.000SP.B.134
Grade:	08
Primary Claim:	Claim 3: Communicating Reasoning Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Secondary Claim(s):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency. Claim 2: Problem Solving Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.
Primary Content Domain:	Statistics and Probability
Secondary Content Domain(s):	
Assessment Target(s):	3 B: Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. 1 J: Investigate patterns of association in bivariate data. 2 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace. 2 D: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Standard(s):	8.SP.4
Mathematical Practice(s):	1, 2, 3, 5, 6, 7
DOK:	3
Item Type:	ER
Score Points:	4
Difficulty:	M
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-Specific Attributes (e.g., accessibility issues):	Calculators may be used for this item.
Notes:	The table consists of a response space in each blank cell. Each response space allows for a maximum of 2 digits.

Jacob surveyed 25 adults to ask whether they had at least one child under the age of 18 and whether they had at least one pet. This table shows the results of the survey.

Adult	At Least One Child Under the Age of 18		At Least One Pet	
	Yes	No	Yes	No
A	✓		✓	
B		✓		✓
C	✓			✓
D		✓		✓
E		✓	✓	
F		✓		✓
G		✓	✓	
H	✓		✓	
I	✓		✓	
J	✓			✓
K		✓		✓
L	✓		✓	
M		✓	✓	
N	✓		✓	
O		✓		✓
P	✓		✓	
Q		✓		✓
R	✓		✓	
S		✓		✓
T	✓		✓	
U		✓	✓	
V	✓		✓	
W		✓		✓
X		✓	✓	
Y		✓	✓	

Part A

Use the results of the survey to complete this table.

At Least One Pet	At Least One Child Under the Age of 18	
	Yes	No
Yes		
No		

Part B

Jacob made the conjecture that there is a possible association between whether an adult has at least one child under the age of 18 and whether the adult has at least one pet.

State whether the results of the survey provide evidence that adults who have at least one child under the age of 18 also tend to have at least one pet. Explain your answer.

Sample Top-Score Response:

Part A:

At Least One Pet	At Least One Child Under the Age of 18	
	Yes	No
Yes	9	6
No	2	8

Part B:

Yes, there is evidence that the adults who have at least one child under the age of 18 also tend to have at least one pet. I found the relative frequencies for whether the adult had at least one pet or not given that the adult had at least one child and then given that the adult did not have any children, and 82% of the adults who had at least one child also had at least one pet. My work is shown below.

At Least One Pet	At Least One Child Under the Age of 18		Totals
	Yes	No	
Yes	$\frac{9}{11} \approx 82\%$	$\frac{6}{14} \approx 43\%$	$\frac{15}{25} = 60\%$
No	$\frac{2}{11} \approx 18\%$	$\frac{8}{14} \approx 57\%$	$\frac{10}{25} = 40\%$

Scoring Rubric:

Responses to this item will receive 0-4 points, based on the following:

Part A

2 points: The student thoroughly understands how to construct two-way tables. The student's response in *Part A* matches the sample top-score response.

1 point: The student shows a partial understanding of how to construct two-way tables. The student makes one or two minor mathematical errors when constructing the table.

0 points: The student shows inconsistent or no understanding of how to construct two-way tables. The student makes several mathematical errors when constructing the table.

or one or more conceptual errors.

Part B

2 points: The student thoroughly understands how to interpret two-way tables. The student uses relative frequencies or a similar method in an explanation that corresponds with the table the student provided in *Part A*.

1 point: The student shows a partial understanding of how to interpret two-way tables. The student uses the numbers in the table without using relative frequencies or a similar method in an explanation that corresponds with the table the student provided in *Part A*.

0 points: The student shows inconsistent or no understanding of how to interpret two-way tables. The student does not use the table to help construct the explanation OR the student writes an explanation that does not correspond with the table the student provided in *Part A*.