Change the Denominator

Grade 11 | Mathematics | Task cards | 40 minutes

Learning target

Calculate conditional probabilities and test independence from a two-way table.

Prerequisites and materials

Fractions, percentages, and two-way tables. Provide pages 2-3, pencil, and a calculator if needed. These are paper-based analyses of fictional data; no physical experiment is required.

Teaching sequence

5 min: Introduce the model and vocabulary.

10 min: Partners rehearse the four card tasks.

15 min: Each learner records calculations and reasoning.

7 min: Compare methods and revise one response.

3 min: Explain one assumption or limitation.

Assessment and access

12 points: 3 per response. Keep calculations, units, and reasoning visible. Allow oral rehearsal, annotate variables, and supply a calculator or worked example with different values during practice. For assessment, clarify directions without giving answers.

Extension

Explain why a higher sample defect rate does not alone establish which machine should be replaced.

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PREVIEW - first two pages only. Full package includes responses and answer key.



Lesson reference

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Use a fictional inspection of 200 model components. Each component is counted in exactly one table cell. These counts describe only this dataset.

Vocabulary	Meaning
conditional probability	Probability within a stated subgroup.
joint event	Two specified events occurring together.
independence	One event does not change the probability of the other.

Reference data

Machine	Defective	Not defective	Total
A	12	88	100
B	3	97	100
Total	15	185	200

Rules and assumptions

P(defective | A) uses A's total as denominator. P(A | defective) uses all defective components as denominator. Reversing the condition generally changes the answer.



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