LESSON MAKER PRO

Test the Difference

Compare results from randomized experiments.

HIGH SCHOOL · S.IC.B.7.b

S.IC.B.7.b "Conduct statistical experiments."

NAME _____ DATE _____

COMPARE SUCCESS RATES

Randomly assign people to two groups and measure the same outcome in each group. Find each success rate, then subtract the control rate from the treatment rate. Report the gap in percentage points. A gap can occur by chance, so a simulation can help you judge the evidence.

WORKED EXAMPLE

Students are randomly assigned to two study methods. How much higher is the flashcard group's success rate?

QUIZ RESULTS

Method	Met goal	Students
Flashcards	6	8
Rereading	2	8

1. Flashcards: 6/8 = 75%.
2. Rereading: 2/8 = 25%.
3. Subtract: 75% - 25% = 50 percentage points.

Answer: The flashcard rate is 50 percentage points higher.

PRACTICE 4 problems

1 Random groups A and B each have 10 students. In A, 7 succeed; in B, 4 succeed. Find A's rate minus B's rate in percentage points.

ANSWER _____

2 Random groups A and B each have 20 students. In A, 13 succeed; in B, 9 succeed. Find A's rate minus B's rate in percentage points.

ANSWER _____

3 Random groups A and B each have 16 students. In A, 12 succeed; in B, 4 succeed. Find A's rate minus B's rate in percentage points.

ANSWER _____

4 Random groups A and B each have 25 students. In A, 17 succeed; in B, 7 succeed. Find the rate gap in percentage points and name the group with the higher rate.

ANSWER _____

APPLY IT Show your work

1 A school randomly assigns students to try one of two lunch-order apps. On app A, 24 of 30 students place an order in under a minute. On app B, 15 of 30 do. Find the rate gap in percentage points. Which app has the higher rate?

WORK SPACE

ANSWER _____

2 Students are randomly assigned to muted or standard phone alerts for a week. With muted alerts, 18 of 24 finish homework before 9 p.m. With standard alerts, 12 of 24 do. Find the rate gap. Can the gap alone rule out chance?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a randomized test, 21 of 30 students using a new review plan meet a goal, compared with 12 of 30 using the usual plan. The table shows 40 simulated rate gaps if the plans have no real effect. Find the observed gap and the fraction of simulations with a gap at least that large. Using a cutoff of 5% or less, is this strong evidence of an effect?

SIMULATED GAPS WITH NO EFFECT

Gap in percentage points	Simulations
0 to 9	16
10 to 19	14
20 to 29	9
30 or more	1

WORK SPACE AND ANSWER

ANSWER KEY

Test the Difference

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Random groups A and B each have 10 students. In A, 7 succeed; in B, 4 succeed. Find A's rate minus B's rate in percentage points.	**30 percentage points**
2	Random groups A and B each have 20 students. In A, 13 succeed; in B, 9 succeed. Find A's rate minus B's rate in percentage points.	**20 percentage points**
3	Random groups A and B each have 16 students. In A, 12 succeed; in B, 4 succeed. Find A's rate minus B's rate in percentage points.	**50 percentage points**
4	Random groups A and B each have 25 students. In A, 17 succeed; in B, 7 succeed. Find the rate gap in percentage points and name the group with the higher rate.	**40 percentage points; group A**

PART 2 · APPLY IT

1. **30 percentage points; app A** App A's rate is 24/30 = 80%, and app B's is 15/30 = 50%. The gap is 80% - 50% = 30 percentage points.
2. **25 percentage points; no, the gap alone cannot rule out chance.** The rates are 18/24 = 75% and 12/24 = 50%, a gap of 25 percentage points. Random assignment helps compare the settings, but chance could still produce a gap.

CHALLENGE

The observed gap is 30 percentage points. The fraction is 1/40 = 2.5%. Yes, this meets the stated cutoff for strong evidence.

Accept equivalent subtraction in the reverse order if the student clearly identifies which group has the higher rate. In the challenge, accept 1/40 or 2.5% for the simulation result.