

Treatment Data Duel

Compare rates from randomized experiments.

HIGH SCHOOL • MA.912.DP.5.9

MA.912.DP.5.9 "Compare two treatments using data from an experiment in which the treatments are assigned randomly."

NAME _____

DATE _____

COMPARE OUTCOME RATES

When treatments are assigned randomly, compare outcome rates, not just the number of successes. Divide each treatment's successes by its total, then subtract the rates to find the difference in percentage points. A higher observed rate is evidence that one treatment may work better.

WORKED EXAMPLE

In a randomized experiment, Treatment P helped 18 of 24 students reach a goal. Treatment Q helped 12 of 24 students. Which treatment had the higher rate, and by how many percentage points?

1. Treatment P rate = $18/24 = 3/4 = 75\%$.
2. Treatment Q rate = $12/24 = 1/2 = 50\%$.
3. Difference = $75\% - 50\% = 25$ percentage points.
4. Treatment P has the higher observed rate.

Answer: Treatment P, by 25 percentage points.

PRACTICE 4 problems

- 1** In a randomized experiment, 13 of 20 students using Treatment A met a goal. For Treatment B, 9 of 20 met it. Which treatment had the higher rate, and by how many percentage points?

ANSWER _____

- 2** Treatment C had 8 successes out of 16. Treatment D had 10 successes out of 20. Compare the two success rates.

ANSWER _____

- 3** Treatment E had 22 successes out of 40. Treatment F had 14 successes out of 35. Which treatment had the higher rate, and by how many percentage points?

ANSWER _____

- 4** Treatment G had 14 successes out of 28. Treatment H had 15 successes out of 30. Write both rates in simplest form. What does the comparison show?

ANSWER _____

APPLY IT Show your work

- 1** Students were randomly assigned to study with calm audio or no audio. Each treatment had 36 students. Use the table to compare the rates of students who reported finishing their planned study tasks. Which treatment had the higher rate, and by how many percentage points?

STUDY TASK RESULTS

Treatment	Finished tasks	Did not finish
Calm audio	26	10
No audio	20	16

ANSWER _____

- 2** A sports club randomly assigned 30 players to each of two recovery routines. With Routine A, 21 players reported less soreness the next day. With Routine B, 15 players reported less soreness. Which routine had the higher observed rate, and what can the club reasonably conclude?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a randomized experiment, Treatment A produced 31 successful outcomes among 40 participants. Treatment B produced 29 successful outcomes among 35 participants. Which treatment had the higher success rate? Use cross products to justify your answer, find the difference in percentage points, and explain why comparing only 31 and 29 would be misleading.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	In a randomized experiment, 13 of 20 students using Treatment A met a goal. For Treatment B, 9 of 20 met it. Which treatment had the higher rate, and by how many percentage points?	Treatment A, by 20 percentage points.
2	Treatment C had 8 successes out of 16. Treatment D had 10 successes out of 20. Compare the two success rates.	The rates are the same, $1/2$ for each treatment.
3	Treatment E had 22 successes out of 40. Treatment F had 14 successes out of 35. Which treatment had the higher rate, and by how many percentage points?	Treatment E, by 15 percentage points.
4	Treatment G had 14 successes out of 28. Treatment H had 15 successes out of 30. Write both rates in simplest form. What does the comparison show?	$14/28 = 1/2$ and $15/30 = 1/2$; the treatments have the same observed rate.

PART 2 • APPLY IT

- Calm audio had the higher rate by $1/6$, or $16\frac{2}{3}$ percentage points.** The rates are $26/36 = 13/18$ for calm audio and $20/36 = 5/9$ for no audio. Their difference is $1/6$.
- Routine A had the higher observed rate by $1/5$, or 20 percentage points. Because players were randomly assigned, the results are evidence that Routine A may reduce soreness more.** Routine A has rate $21/30 = 7/10$, and Routine B has rate $15/30 = 1/2$. The difference is $1/5$.

CHALLENGE

Treatment B had the higher rate because $29/35 > 31/40$, since $29 \times 40 = 1160$ and $31 \times 35 = 1085$. The difference is $3/56$, or $5\frac{5}{14}$ percentage points. Comparing only 31 and 29 is misleading because the treatment groups have different totals.

Accept equivalent simplified fractions, decimals, or percentage-point differences when correct. For conclusions, accept cautious language stating that random assignment supports evidence of a treatment effect.