LESSON MAKER PRO

Model Match Check

Compare observed results with a model's expected distribution.

HIGH SCHOOL · MA.912.DP.5.5

MA.912.DP.5.5 "Determine if a specific model is consistent within a given process by analyzing the data distribution from a data-generating process."

NAME _____ DATE _____

CHECK THE DISTRIBUTION

A model is consistent with data when the observed category counts are close to the model's expected counts. Find the expected count for each category, then compare it with the observed count. On this page, call a model consistent when every category is at most two away from its expected count.

WORKED EXAMPLE

A model predicts 11 green and 20 gold results in 31 trials. The data show 12 green and 19 gold results. Is the model consistent?

1. Expected counts: 11 green and 20 gold.
2. Green differs by one, and gold differs by one.
3. Both differences are at most two.

Answer: Yes, the model is consistent.

PRACTICE 5 problems

1 A fair coin is flipped 18 times. The results are 9 heads and 9 tails. Is the fair-coin model consistent?

ANSWER _____

2 A model says three survey choices are equally likely. In 15 responses, the counts are 4, 5, and 6. Is the model consistent?

ANSWER _____

3 A fair die is rolled 24 times. The counts for faces 1 through 6 are 2, 3, 4, 5, 6, and 4. Is the fair-die model consistent?

ANSWER _____

4 A model says two outcomes are equally likely. In 26 trials, the outcomes occur 16 times and 10 times. Is the model consistent?

ANSWER _____

5 A model predicts equal numbers of blue, red, and yellow results in 24 draws. The data are 6 blue, 10 red, and 8 yellow. Is the model consistent?

ANSWER _____

APPLY IT Show your work

1 A music app model predicts that 1/2 of 42 playlist songs will be pop, 1/3 will be hip-hop, and 1/6 will be rock. A playlist has 22 pop songs, 13 hip-hop songs, and 7 rock songs. Is the model consistent?

WORK SPACE

ANSWER _____

2 A gaming channel's alert model predicts that 3/5 of 35 alerts will be tournament alerts and 2/5 will be update alerts. The log shows 25 tournament alerts and 10 update alerts. Is the model consistent?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two models describe 45 video recommendations in three categories. Model A predicts 24, 15, and 6 recommendations. Model B predicts 22, 17, and 6 recommendations. The observed counts are 23, 16, and 6. Which model or models are consistent? Explain using the category differences.

WORK SPACE AND ANSWER

ANSWER KEY

Model Match Check

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A fair coin is flipped 18 times. The results are 9 heads and 9 tails. Is the fair-coin model consistent?	**Yes. The expected counts are 9 heads and 9 tails.**
2	A model says three survey choices are equally likely. In 15 responses, the counts are 4, 5, and 6. Is the model consistent?	**Yes. The expected count is 5 for each choice.**
3	A fair die is rolled 24 times. The counts for faces 1 through 6 are 2, 3, 4, 5, 6, and 4. Is the fair-die model consistent?	**Yes. The expected count is 4 per face, and every count is within two.**
4	A model says two outcomes are equally likely. In 26 trials, the outcomes occur 16 times and 10 times. Is the model consistent?	**No. The expected count is 13 for each outcome, and each observed count differs by 3.**
5	A model predicts equal numbers of blue, red, and yellow results in 24 draws. The data are 6 blue, 10 red, and 8 yellow. Is the model consistent?	**Yes. The expected count is 8 for each color.**

PART 2 · APPLY IT

1. **Yes, the model is consistent.** The expected counts are 21 pop, 14 hip-hop, and 7 rock. The differences are one, one, and zero.
2. **No, the model is not consistent.** The expected counts are 21 tournament alerts and 14 update alerts. Each observed count differs from expected by 4.

CHALLENGE

Both Model A and Model B are consistent. For each model, the category differences are one, one, and zero.

Accept equivalent statements that identify the expected counts and correctly compare each observed count. Use the page rule that every category must be within two of its expected count.