

شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية



شرح الدرس الثاني Using statistical experiments من الوحدة الثامنة

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تاريخ نشر الملف على موقع المناهج: 2023-10-26 14:41:50 | اسم المدرس: محمد زياد

التواصل الاجتماعي بحسب الصف الحادي عشر المتقدم



روابط مواد الصف الحادي عشر المتقدم على تلغرام

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المزيد من الملفات بحسب الصف الحادي عشر المتقدم والمادة رياضيات في الفصل الأول

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Experimental Probability vs. Theoretical Probability

Experimental Probability is found by repeating an experiment and observing the outcomes.

$$P(\text{event}) = \frac{\text{number of times event occurs}}{\text{total number of trials}}$$

Example:

A coin is tossed 10 times:
A head is recorded 7 times
and a tail 3 times.

$$P(\text{head}) = \frac{7}{10}$$

$$P(\text{tail}) = \frac{3}{10}$$

Theoretical Probability is what is expected to happen based on mathematics

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$$

Example:

A coin is tossed.

$$P(\text{head}) = \frac{1}{2}$$

$$P(\text{tail}) = \frac{1}{2}$$

Ex1: A student tossed a fair die 150 times and recorded the results. Find the theoretical and experimental probabilities of rolling a 5. Write your answer as a percentage rounded to the nearest tenth, if necessary.

Number	Frequency
1	51
2	16
3	23
4	19
5	24
6	17

The theoretical probability of rolling a 5 is $\frac{1}{6}$ %.

$$\frac{1}{6} = 16.67\%$$

The experimental probability of rolling a 5 is $\frac{24}{150}$ %.

$$\frac{24}{150} = 16\%$$

Ex2:

A student spun a spinner with 4 equal sections 100 times and recorded the results.

Spinner Section	Frequency
Red	35
Blue	38
Green	13
Yellow	14

- a. Find the theoretical probability of spinning blue.
Write your answer as a percentage rounded to the nearest tenth, if necessary.

$$\frac{1}{4} = 25\%$$

- b. Find the experimental probability of spinning blue.
Write your answer as a percentage rounded to the nearest tenth, if necessary.

$$\frac{38}{100} = 38\%$$

Ex3:

A student flipped a coin 125 times and recorded the results.

Coin Result	Frequency
Heads	73
Tails	52

- a. Find the theoretical probability of the coin landing on heads. Write your answer as a percentage rounded to the nearest tenth, if necessary.

$$\frac{1}{2} = 50\%$$

- b. Find the experimental probability of the coin landing on heads. Write your answer as a percentage rounded to the nearest tenth, if necessary.

$$\frac{73}{125} = 58.4\%$$

Run and evaluate a probability Simulation

Suggested tools to create a simulation:

1- Cards

2- Coin toss

3- Marbles

4- Standard die

5- Random number generator

6- Spinner

Ex4: Tiana sells handmade earrings online. Last month she sold 60% of her inventory. Design and run a simulation that can be used to estimate the probability of selling inventory.

Sample answer: Use a spinner that is divided into 2 sectors, one at 60% area, or 216° , the other at 40%, or 144° . Perform 50 trials and record answers in a frequency table. Based on the simulation, probability of selling inventory is 0.64, and the probability of not selling inventory is 0.36.

Sample data:

Outcomes	Frequency
Sold	32
Not sold	18
Total	50

$$60\% \times 360^\circ = 216^\circ$$

$$40\% \times 360^\circ = 144^\circ$$

Ex5: Lamar designed a soccer computer game. He coded the program such that a player will make a goal on 35% of the attempts. Paola is testing the game and thinks there may be an error in the game's programming. She attempted to make 30 goals and only 4 were successful. Run and evaluate a simulation and decide whether Paola is correct.

Sample answer: The theoretical probability of making a goal is $\frac{7}{20}$ and the theoretical probability of missing the goal is $\frac{13}{20}$. I can use a random number generator to create a simulation. For numbers 1–20, let 1–7 represent a goal and 8–20 represent a miss. Based on 100 trials, the experimental probability of making a goal is 41%. Because Paola's success rate was only about 13%, it is likely that there is an error in the programming.