



Warm Up

Date: March 11

Ch. 7 Lesson 8

Test Review

Test will be Mach 13

1) Tim surveyed his class and asked which class deserves free pizza? What is the problem with this question and how can he improve his results?

Problem is that he only surveyed his class
This will provide bias results.

→ Ask all classes or ask all teachers is a way to improve this question.

2) Write a better question for the following

i) Which do you prefer more kind kittens or vicious reptiles?

Do not need kind or vicious since they provide extra information.

Which do you prefer kittens or reptiles?

3) Which graph would you use if you are comparing the test results of different students?

Since comparing data we use a bar graph.

4) A box contains 3 scarfs, 2 socks, 5 hats and 6 mittens. If Sam was to reach in and pull one item out at random, what is the probability of getting a sock?

$$\begin{aligned} \text{Total} &= 3+2+5+6 \\ &= 16 \end{aligned}$$

$$P(\text{socks}) = \frac{\# \text{ socks}}{\text{Total items}} = \frac{2}{16} \stackrel{\div 2}{=} \frac{1}{8}$$

#4 is an example of what probability? Theoretical

→ Didn't do an experiment.

Just based of # of items

1) a) Possible outcomes are win, lose and spin again

b) Possible outcomes are red, black, blue

c) Possible outcomes are 1,2,3

2a) If he tossed it 20 times and heads showed 12 times then tails is 20 - heads

$$20 - 12$$

$$8$$

12 Head 8 Tails

So tails showed 8 times

2b) Experimental probability

$$p(\text{head}) = \frac{\# \text{ head tallied}}{\text{Total tries}} = \frac{12}{20} = \frac{3}{5}$$

$$\frac{12}{20} = \frac{3}{5}$$

$$p(\text{tails}) = \frac{\# \text{ tails tallied}}{\text{Total tries}} = \frac{8}{20} = \frac{2}{5}$$

$$\frac{8}{20} = \frac{2}{5}$$

Theoretical

$$P(H) = \frac{\#H}{\text{Total}} = \frac{1}{2}$$

Sample Solutions

2. c) Yes, these results are what we would expect because 8 and 12 are both close to 10. $\frac{1}{2}$ of 20 is 10. Heads and tails should each show up about $\frac{1}{2}$ of the time.
- d) I would expect the results to be closer to the theoretical probabilities because the number of trials is much greater. I would expect Dave to get about 50 heads and 50 tails because heads and tails are equally likely outcomes. I would not expect the results to be exactly 50 heads and 50 tails.

3a) Avil spun the pointer 24 times (i counted the tally marks)

b) $p(\text{blue}) = \frac{\# \text{ blue tallied}}{\text{Total tries}} = \frac{17}{24}$

$$p(\text{orange}) = \frac{\# \text{ orange tallied}}{\text{Total tries}} = \frac{7}{24}$$

c) Theoretical

$$p(\text{blue}) = \frac{\# \text{ blue}}{\text{Total}} = \frac{3}{4} = \frac{18}{24}$$

$$p(\text{orange}) = \frac{\# \text{ orange}}{\text{Total}} = \frac{1}{4} = \frac{6}{24}$$

These are close to the above probabilities, so results are as expected.

RECALL Two types of Probability

Study

Theoretical Probability - is what is expected to happen based on theory of math. Use a formula.

$$P(\text{event}) = \frac{\text{\# of favorable outcomes}}{\text{Total \# of possible outcomes}}$$

$$\text{Ex) } P(\text{head on coin}) = \frac{\text{\# of heads}}{\text{Total sides of coin}} = \frac{1}{2}$$



TODAY

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:

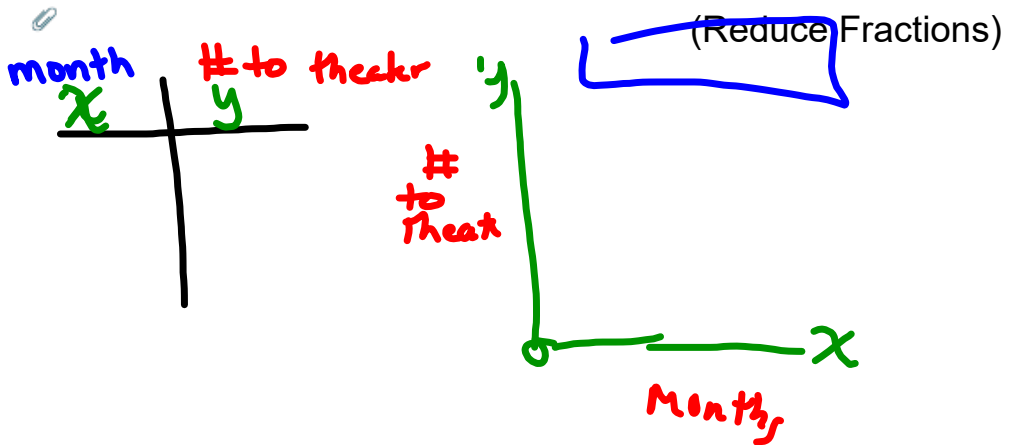
A coin is tossed 10 times:
A head is recorded 7 times
and a tail 3 times.

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

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

Class/Homework

Test Outline
Worksheet



Class/Homework

Page 278-279 #4

Not just the answer. Write the probability statement

(Reduce Fractions)

Test Tomorrow

Page 284 - 285 #1a,#3abc, #4abcd, #5, #7. #8a, #8b

4. Nina and Allegra placed 35 red tiles and 15 yellow tiles in a bag. At random, they picked a tile from the bag, recorded its colour, and replaced it. They did this 100 times.
- a) What is the theoretical probability of picking a red tile? $\frac{35}{50}$, or $\frac{7}{10}$
 - b) Predict how many times Nina and Allegra should get a red tile in 100 trials. *About 70 times*
 - c) Nina and Allegra picked a red tile from the bag 58 times. What is the experimental probability of picking a red tile? $\frac{58}{100}$, or $\frac{29}{50}$
 - d) Nina said, "I think we did something wrong." Do you agree? Why?
 - e) Work with a partner. Try the experiment. Record your results. What is your experimental probability of picking a red tile?

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4. d) No, I do not agree that they did something wrong. There are often differences between experimental results and theoretical probabilities. These differences can occur because of chance. They do not necessarily mean a mistake has been made. More trials should be conducted to get closer to the theoretical probability.
- e) We drew 77 red tiles and 23 yellow tiles in 100 trials. So, the experimental probability of picking a red tile is $\frac{77}{100}$.
5. c) 6, 2, 6, 5, 2, 3, 4, 5, 1, 2, 5, 6, 2, 6, 2, 6, 4, 4, 1, 2

Number Rolled	Tally
1	//
2	
3	
4	
5	
6	

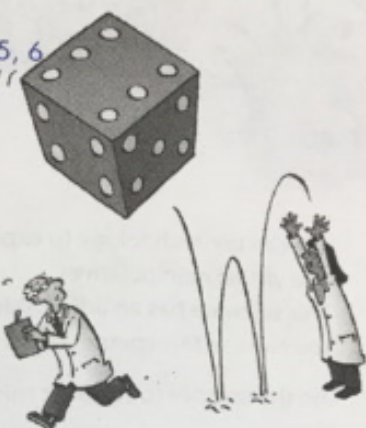
i) $\frac{5}{20}$, or $\frac{1}{4}$; ii) $\frac{14}{20}$, or $\frac{7}{10}$; iii) $\frac{9}{20}$; iv) $\frac{8}{20}$, or $\frac{2}{5}$

The experimental probabilities are not very close to the theoretical probabilities. For example, the theoretical probability of rolling a 6 is $\frac{1}{6}$ and our experimental probability is $\frac{1}{4}$. I think this is because 20 is not a large number of trials and the results happen by chance.

5. A die labelled 1 to 6 is rolled.

- What are the possible outcomes? 1, 2, 3, 4, 5, 6
- What is the theoretical probability of each outcome?
 - rolling a 6 $\frac{1}{6}$
 - rolling an even number $\frac{3}{6}$, or $\frac{1}{2}$
 - rolling a 2 or a 4 $\frac{2}{6}$, or $\frac{1}{3}$
 - rolling a number greater than 4 $\frac{2}{6}$, or $\frac{1}{3}$
- Work with a partner. Roll a die 20 times. Record your results. What is the experimental probability of each outcome in part b? How do these probabilities compare with the theoretical probabilities? Explain.
- Combine your results with those of 4 other groups. What is the experimental probability of each outcome in part b? How do these probabilities compare with the theoretical probabilities? Explain.

What do you think might happen if you rolled the die 500 times?



b. c) 6, 2, 6, 5, 2, 3, 4, 5, 1, 2, 5, 6, 2, 6, 2, 6, 4, 4, 1, 2

Number Rolled	Tally
1	//
2	
3	
4	
5	
6	

i) $\frac{5}{20}$, or $\frac{1}{4}$; ii) $\frac{14}{20}$, or $\frac{7}{10}$; iii) $\frac{9}{20}$; iv) $\frac{8}{20}$, or $\frac{2}{5}$

The experimental probabilities are not very close to the theoretical probabilities. For example, the theoretical probability of rolling a 6 is $\frac{1}{6}$ and our experimental probability is $\frac{1}{4}$. I think this is because 20 is not a large number of trials and the results happen by chance.

d) $\frac{23}{100}$, $\frac{60}{100}$, $\frac{37}{100}$, $\frac{36}{100}$

These results are closer to the theoretical probabilities. For example, $\frac{1}{3}$ of 100 is about 33, which is close to our experimental results: we rolled a two or a four 37 times and a number greater than four 36 times. If we rolled the die 500 times, I think the experimental probabilities and the theoretical probabilities would be quite close, but I don't think they would be exactly the same.

6. Zeroun and Ammon are playing a game.
They spin the pointer on this spinner.
If the pointer lands on an even number, Zeroun wins.
If the pointer lands on an odd number, Ammon wins.



- a) Is this a fair game? How do you know?
b) What is the theoretical probability of the pointer landing on an even number? $\frac{5}{10}$, or $\frac{1}{2}$
c) Use a spinner like this one.
Play the game at least 30 times.
Record your results.
Were the results what you expected? Explain.
d) What results would you expect if you played the game 100 times? Explain how you made your prediction.

6. a) Yes; the game is fair. There are 10 congruent sectors. Five have an even number and 5 have an odd number.
c) I expected to get an even number 15 times because $\frac{1}{2}$ of 30 is 15. The results were not what I expected. In 30 trials, the pointer landed on an even number 21 times and on an odd number 9 times.
d) I would expect to get an odd number about 50 times. I know that $\frac{1}{2}$ of 100 is 50.

Practice

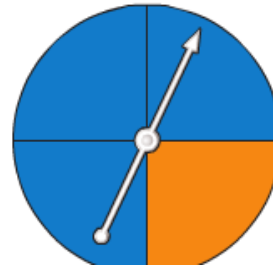
1. For each experiment, state the possible outcomes.
 - a) The spinner has 3 equal sectors labelled Win, Lose, Spin Again.
The pointer on a spinner is spun.
 - b) A bag contains 6 marbles: 3 red, 2 black, and 1 blue.
One marble is picked at random.
 - c) A regular tetrahedron has 4 faces labelled 1, 2, 2, 3.
The tetrahedron is rolled.



2. Dave tossed a coin 20 times. Heads showed 12 times.
 - a) How many times did tails show?
 - b) What fraction of the tosses showed heads? Tails?
 - c) Are these results what you would expect? Explain.
 - d) Dave tosses the coin 100 times.
What would you expect the results to be? Explain.

3. Avril spins the pointer on this spinner several times. Here are her results.

Blue	Orange



- How many times did Avril spin the pointer?
How do you know?
 - What fraction of the spins were blue? Orange?
 - Were Avril's results what you would have expected? Explain.
4. Nina and Allegra placed 35 red tiles and 15 yellow tiles in a bag. At random, they picked a tile from the bag, recorded its colour, and replaced it. They did this 100 times.
- What is the theoretical probability of picking a red tile?
 - Predict how many times Nina and Allegra should get a red tile in 100 trials.
 - Nina and Allegra picked a red tile from the bag 58 times.
What is the experimental probability of picking a red tile?
 - Nina said, "I think we did something wrong." Do you agree? Why?
 - Work with a partner. Try the experiment. Record your results.
What is your experimental probability of picking a red tile?



5. A die labelled 1 to 6 is rolled.
- What are the possible outcomes?
 - What is the theoretical probability of each outcome?
 - rolling a 6
 - rolling an even number
 - rolling a 2 or a 4
 - rolling a number greater than 4
 - Work with a partner. Roll a die 20 times. Record your results. What is the experimental probability of each outcome in part b? How do these probabilities compare with the theoretical probabilities? Explain.
 - Combine your results with those of 4 other groups. What is the experimental probability of each outcome in part b? How do these probabilities compare with the theoretical probabilities? Explain. What do you think might happen if you rolled the die 500 times?



6. Zeroun and Ammon are playing a game. They spin the pointer on this spinner. If the pointer lands on an even number, Zeroun wins. If the pointer lands on an odd number, Ammon wins.
- Is this a fair game? How do you know?
 - What is the theoretical probability of the pointer landing on an even number?
 - Use a spinner like this one. Play the game at least 30 times. Record your results. Were the results what you expected? Explain.
 - What results would you expect if you played the game 100 times? Explain how you made your prediction.



Attachments

Unit Test on Data and Probability lesson 1 2 5 6 7 OUT LINE.docx