Solutions

Nov 20-18:35

1. How can probability be used to predict the winner in a game or an election?
2. Why do you think that the probability in games is predicted, while the probability in sports and weather is experimental?

1. Identify all of the outcomes

2. Games will use coins or number cubes or spinners. These have a fixed number of outcomes. Sports scores and weather patterns do not. That is why these are experimental.

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3. The weather report says there is a 50% chance of snow.

a) What is the probability of snow as a fraction?

b) What is the probability of no snow?

$\frac{1}{2}$

50%

4. The weather report says there is a 100% chance of rain.

a) What is the probability of rain?

b) What is the probability of no rain?

1 (certain)

0 (impossible)

5. The weather report says there is a 0% chance of precipitation.

a) What is the probability of precipitation?

b) What is the probability of no precipitation?

0 (impossible)

1 (certain)

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6. What is the probability of Connor winning the election?

7. What percent of the students polled chose Gilbert?

8. Who is least likely to win the election? State the probability.

Three students are running for student council. 100 students are polled.

Student Council Poll Results

Student	Votes
Connor	20
Gilbert	50
Marilyn	30

6. $P(\text{Connor}) = \frac{20}{100} = \frac{1}{5}$

7. $P(\text{Gilbert}) = \frac{50}{100} = \frac{1}{2}$

8. Connor is least likely. He got the least number of votes in the poll.

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9. Vivian's batting average is .400. This means that she has gotten a hit 40% of her times at bat.

a) What is the probability of Vivian getting a hit on her next at-bat?

b) What is the probability of Vivian not getting a hit on her next at-bat?

40%

60%

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10. Four students are running for grade 8 class president. In a poll, 8 students chose Pedro, 4 chose Tristan, 6 chose Arielle, and 7 chose Brent.

a) What fraction of the students chose Tristan?

b) What percent of the students chose Brent?

c) There are 150 students in grade 8. If the poll is accurate, can you determine the number of votes each student will receive in the election? Explain how.

d) Determine the number of votes each student will receive in the election, based on the poll results.

a) $\frac{4}{25}$

b) $\frac{7}{25}$

d) Pedro $= \frac{8}{25} \times 150$

$= 48$

Tristan $= \frac{4}{25} \times 150$

$= 24$

Arielle $= \frac{6}{25} \times 150$

$= 36$

Brent $= \frac{7}{25} \times 150$

$= 42$

c) Yes. Multiply the probability of each student winning by the total number of votes.

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11. Lorenzo and Wesley are playing backgammon, which uses two number cubes. A player can move two game pieces separately or move one game piece the sum of the numbers shown on the number cubes.

a) What is the probability that the sum is 7?
b) What is the probability that the sum is less than 5?
c) Lorenzo needs a 10 or higher on his next roll to win. Explain how to determine the probability of rolling a 10 or higher. State the probability.

a) $6 \times 6 = 36$ outcomes

$(1,6)(2,5)(3,4)$
$(4,3)(5,2)(6,1)$

$P(\text{sum of } 7) = \frac{6}{36}$

b) $(1,3)(2,2)(3,1)$
$(1,2)(2,1)$
$(1,1)$

$= \frac{6}{36}$

c) $P(11) = \frac{2}{36}$

$P(12) = \frac{1}{36}$

$\text{Total} = \frac{3}{36}$

$(5,6)(6,5)$
$(6,6)$

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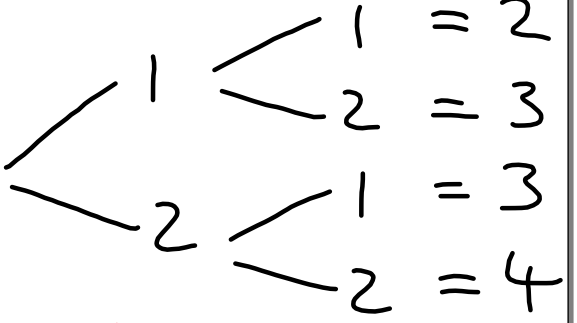
Try This!

12. Gillian and Brandon play "best of three wins" to decide who will speak first at the class assembly. Both Gillian and Brandon count to three and show a number 1 or 2 on their fingers. If the sum is odd, Gillian wins. Otherwise, Brandon wins.

a) What is the probability of an even sum? What is the probability of an odd sum?
b) If you were to play this game, would you call odds or evens? Explain why.
c) This was to be a three-round game. Why did Brandon say Gillian won after only 2 rounds?



a) $P(\text{even}) = \frac{2}{4}$

$P(\text{odd}) = \frac{2}{4}$

b) Doesn't matter. It is an even chance for either result.

c) If she won the first 2 so even if she lost the 3rd she would still win.

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