

Warm-Up

Page 429
#14



Shaquille O'Neal's free throw percentage during one season was 62%. A teacher points out that this means each time Shaquille attempted a free throw during that season, his probability of making the shot was 62%.

A student then says:

"Shaquille either makes the shot or he doesn't.

So, isn't the probability 50%?"

Explain the flaw in the student's thinking.

↳ ignoring skill level

3. Indicate whether each decision is based on theoretical probability, experimental probability, or subjective judgment.

Explain how you know.

- a) The last two times Andrei won a prize at a coffee shop, he ordered a medium hot chocolate. Andrei never won when he ordered a large hot chocolate, so today he orders a medium hot chocolate.
- b) Instead of buying her own lottery ticket, Martha pools her money with the people at work to buy more tickets and increase her chances of winning.
- c) Anita boards the last car of a train because, in the past, the last car always had available seats.
- d) Doug will not travel by airplane even though experts say it is safer to fly than drive.

- 3. a) Experimental probability; decision is based on Andrei's past experience.
- b) Theoretical probability; the more tickets you buy, the greater your chance of winning.
- c) Experimental probability; decision is based on Anita's past experience.
- d) Subjective judgment; decision is based on Doug's feelings.

4. What assumptions is each person making?
- Based on past math quizzes, Claudia says she has a 90% chance of getting a perfect score on her next math quiz.
 - Six times out of ten, Omar gets stuck in traffic when he leaves work. So, he calculates that his chances for getting stuck in traffic today after work are 60%.

Apply

- The weather forecast is 70% chance of rain. Winona had planned to go canoeing. Explain how the decision she makes may be based either on probability or on subjective judgment.
- The student council has a draw for a prize during the school dance. Lei decides not to enter the draw because all of his classmates have entered and he feels unlucky today. Is Lei's decision based on probability, on subjective judgment, or both? Explain.
- Claudia will continue to perform at the same level and the next math quiz will have the same level of difficulty.
 - Omar will leave work at the same time as other days and the traffic patterns are the same every day.
- If Winona doesn't go canoeing, her decision will be based on probability (it is likely that it will rain). If she does go, her decision will be based on subjective judgment (the feeling that it will not rain).
- Lei's decision is based on both: Since many of his classmates entered, his theoretical probability of winning is low. However, he's also basing his decision on his feeling unlucky today, which is subjective judgment.

7. One year, the probability of *not* recovering a stolen vehicle in Montreal was 44%. How could politicians use this fact to argue that:

- a) more money should be allotted to searching for stolen vehicles
- b) more money should not be allotted, and instead should go to different causes

8. Vanessa observes her birdfeeder at the same time each day for a week. She notes that 32 of the 100 birds which visit the feeder are cardinals. She concludes that, in general, there is a 32% probability a bird visiting the feeder will be a cardinal.

- a) What assumptions did Vanessa make?
- b) If each assumption changes, how might the predicted outcome change?

- 7. a) More money should be spent to increase the probability of recovering a stolen vehicle.
- b) Because the probability of recovering a stolen vehicle is so low, there are better ways of spending the money.
- 8. a) Vanessa made the assumption that the same types of birds visit her birdfeeder at different times of the day, every day.
- b) The percent of birds that are cardinals might change.

11. **Assessment Focus** An advertisement for acne treatment boasts:



- a) Explain how a teenager's decision on whether to try this acne treatment could be based on probability and subjective judgment.
- b) If the teenager does decide to try the acne treatment, what assumptions might he be making? For each assumption, explain how the predicted outcome of the treatment might change if the assumption changes.
11. a) The experimental probability may convince the teenager to try the treatment. He may also use subjective judgment about whether to try the treatment, depending on his personal beliefs of the effectiveness of acne treatment.
- b) He would be assuming that he will respond to the treatment in a way that is similar to the responses of most other people who tried the treatment. His response to the treatment may differ from most people's.

Who will win the World Series this year?

Is this question a difficult question? For who?



Suppose you were a fan of a given team how may this affect your answer?

Factors that could lead to problems when **collecting data**:

1. **Bias**--Don't you think 16 year olds should be allowed to leave school at lunch?

Question is worded to influence the answer

2. **Use of language**--*Don't you think 16 year olds should be allowed to leave school at lunch?*

Better Question: Who do you think should be allowed to leave school at lunch?

All grades, if you are over 16, or noone

3. **Timing**--*You just get 90% on a math test and you are asked to say which class is your favorite.*

When the data is collected could influence the answer.

4. **Privacy**-- *If the topic is too personal a person may not want to participate or give untrue answers on purpose.*

Anonymous surveys may help.

How many math tests did you fail?

What is your weight?

5. **Cultural Sensitivity**--*be aware of other cultures and avoid asking offensive questions.*

What is your favorite holiday? Christmas or Easter [this question may not apply to everyone because they may not celebrate either]

Better Question: If you celebrate Christmas and Easter which one is your favorite?

6. **Ethics**-- *the data collected must not be used for purposes other than those told to the participants.*

7. **Cost**--*the cost of collecting the data must be considered*
Do you have to pay to print the questions? hire people to do the survey?

8. **Time**--*how long it takes to collect the data*

If 10 min vs 1 hour [probably have more willing to complete a 10 minute survey]



A survey is conducted to determine the level of school spirit. It is conducted as students leave the gym where their High School Basketball team has just won the championship.

What is the problem with collecting data this way?

How could this problem be avoided?

Example 2 Analyzing Data Collection for Problems

Kublu and Irniq plan to open a shop in Saskatoon that would sell traditional Inuit crafts.

To ensure Saskatoon is the best place for their business, they want to survey residents to find out how popular Inuit crafts are.

Kublu knows that they would get the most accurate results if each household in Saskatoon is surveyed, but Irniq points out that this is problematic. Explain why.



Example 3**Overcoming Potential Problems of Data Collection**

Antonia wants to find out if there is a relationship between household income and how much people spent on Christmas presents.

Identify potential problems Antonia may encounter, and explain how she could deal with the problems.

▶ A Solution

Christmas is not celebrated by all cultures, and so the survey question does not apply to everyone. An appropriate opening question for the survey might be: “Do you celebrate Christmas?” If a person responds “No”, then he or she will not need to answer the other question in your survey.

Information about income and spending habits is personal, so people may be uncomfortable revealing it. An anonymous survey would be appropriate.

The use of language may influence responses.

Examples of inappropriate or intrusive questions would be:

“How much do you make?” and “How much do you spend?”

A better question might be:

“Is the amount you spend on Christmas presents:

- greater than your weekly income?
- less than your weekly income?
- equal to your weekly income?”

Homework page 435

3-8

TEST SIGNED!