

Loaded Dice and Central Tendency: Analyzing Games of Chance  
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**How to Play the Game**

1. Make a prediction for what the outcome will be.
2. Roll the die.
3. Determine your score

**Scoring Method 1**

- If the outcome matches your prediction, you get 100 points.
- If the outcome is different than your prediction, you get 10 points.

Play the Game with Scoring Method 1 ten times. Keep track of your predictions, the outcomes, and your score in the table.

| Trial # | Prediction | Outcome | Score |
|---------|------------|---------|-------|
| 1       |            |         |       |
| 2       |            |         |       |
| 3       |            |         |       |
| 4       |            |         |       |
| 5       |            |         |       |
| 6       |            |         |       |
| 7       |            |         |       |
| 8       |            |         |       |
| 9       |            |         |       |
| 10      |            |         |       |

Total score:

Which prediction do you think will give you the most points with Scoring Method 1? Why?

**Scoring Method 2**

- If the outcome matches your prediction, you get 55 points.
- If the outcome and your prediction differ by 1, you get 45 points.
- If the outcome and your prediction differ by 2, you get 35 points.
- If the outcome and your prediction differ by 3, you get 25 points.
- If the outcome and your prediction differ by 4, you get 15 points.
- If the outcome and your prediction differ by 5, you get 5 points.

Play the Game with Scoring Method 2 ten times. Keep track of your predictions, the outcomes, and your score in the table.

| Trial # | Guess | Outcome | Score |
|---------|-------|---------|-------|
| 1       |       |         |       |
| 2       |       |         |       |
| 3       |       |         |       |
| 4       |       |         |       |
| 5       |       |         |       |
| 6       |       |         |       |
| 7       |       |         |       |
| 8       |       |         |       |
| 9       |       |         |       |
| 10      |       |         |       |

Total score:

Which guess do you think will give you the most points with Scoring Method 2? Is this different from what you said about Scoring Method 1? Why?

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**Analyzing the Game**

Let's analyze these two scoring methods to find the "best prediction" in each case.

Please roll the die 30 times and keep track of the outcomes in the "frequency" row.

|           |   |   |   |   |   |   |
|-----------|---|---|---|---|---|---|
| Outcome   | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency |   |   |   |   |   |   |

Imagine that you had just played the Game using Scoring Method 1.

Calculate what you would have scored if you had predicted "1" each time with these 30 rolls. Repeat the calculations as if you predicted "2" each time, and so on for each outcome.

| N | Potential score if "N" was predicted each time using Scoring Method 1 |
|---|---|
| 1 |   |
| 2 |   |
| 3 |   |
| 4 |   |
| 5 |   |
| 6 |   |

Which prediction would have given you the highest score? If there is a tie, list all of the predictions that give the highest score.

Pool data as a class to determine the number of times that each prediction would have given the highest score. Which number is the "best prediction" with Scoring Method 1? Why is this so?

Imagine that you had just played the Game using Scoring Method 2.

Calculate what you would have scored if you had predicted "1" each time with these 30 rolls. Repeat the calculations as if you predicted "2" each time, and so on for each outcome.

|                           |  |  |
|---------------------------|--|--|
| If I always predicted ... | then Scoring Method 2 would give me ...                                  |  |
|                           | # of 1s      # of 2s      # of 3s      # of 4s      # of 5s      # of 6s |  |
| 1                         | $55( ) + 45( ) + 35( ) + 25( ) + 15( ) + 5( ) =$                         |  |
| 2                         | $45( ) + 55( ) + 45( ) + 35( ) + 25( ) + 15( ) =$                        |  |
| 3                         | $35( ) + 45( ) + 55( ) + 45( ) + 35( ) + 25( ) =$                        |  |
| 4                         | $25( ) + 35( ) + 45( ) + 55( ) + 45( ) + 35( ) =$                        |  |
| 5                         | $15( ) + 25( ) + 35( ) + 45( ) + 55( ) + 45( ) =$                        |  |
| 6                         | $5( ) + 15( ) + 25( ) + 35( ) + 45( ) + 55( ) =$                         |  |

Which guess would have given you the highest score? If there is a tie, list all of the guesses that give the highest score.

Pool data as a class to determine the number of times that each prediction would have given the highest score. Which number is the "best prediction" with Scoring Method 1? Why is this so?