Maths Week/ Wiki Pāngarau 2025

Survivor Series/Kia Mōrehurehu

Day 5 Set D

For students

What to do for students

1 **You can work with one or two others. Teams can be different each day.**

2 **Do the tasks and write any working you did, along with your answers, in your maths book.**

3 **Your teacher will tell you how you can get the answers to the questions and/or have your work checked.**

4 **When you have finished each day, your teacher will give you a word or words from a proverb. You could ask your teacher to explain what a proverb is.**

5 **At the end of the week, put the words together in the right order and you will be able to find the complete proverb! Your teacher may ask you to explain what the proverb means.**

6 **Good luck.**

THINKING STRATEGICALLY

Task 1

You will play a game in groups of 2 - 4 players. Each group needs two 10-sided dice or you may choose to use an online dice roller (if you search using 'dice roller' and Google you will find a standard dice roller that will easily allow you to choose 2 ten-sided dice). If you use actual dice, use the 0 as 10.

Question 1

(a) If you roll two ten-sided dice, what number do you think is the most likely sum of both dice?

(b) What number do you think will be the least likely sum of the two dice?

Instructions

- This is a game played with two ten-sided dice.
- Each player, in a clockwise direction, chooses a sum as their winning roll.
- Every player after the first player may choose to swap numbers with any player before them. The player who has their number taken gets to choose another sum – it may not be a sum that is already taken.
- Every player must have a different winning sum.
- Once each player has chosen their sum, then the game begins with the last player who chose a sum rolling first.
- Play proceeds in an anticlockwise direction. If a player rolls their winning sum, they are the winner of the round. Otherwise, the next player (anticlockwise) rolls and play continues until one player rolls their winning sum. The winning sum is recorded in the table.
- Each round begins with players choosing a new sum. The winner of the last round must choose first.
- To find an overall winner, add each player's winning rolls to get an overall total.
- The highest overall score wins.

Play 10 rounds and record the winning sum each time in the following table.

Player	Winning Sum										Overall Score
	2	3	4	5	6	7	8	9	10	11	

Question 2

(a) What strategy is the best strategy for scoring the highest score – choosing high sums, low sums, or medium sums?
(b) Why do you think this is?

Task 2

Using the grid provided, record all the possible sums for rolling two ten-sided dice. A listing of all possible outcomes for an activity where the outcomes occur randomly (unpredictably) is called the **sample space** for that activity. The outcomes of rolling dice are random, and you will be producing the sample space for the sums resulting from the rolls of two 10-sided dice.

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Question 1

(a) In how many ways can you get a sum of 11?

(b) Which sum or sums does the sample space show will occur least often? Is this sum the same as the sum that occurred least often in your games?

(c) Which sum or sums does the sample space show will occur most often? Is this sum the same as the sum that occurred least often in your games?

(d) Is the largest possible sum in the sample space the same as the largest winning sum that occurred in your games?

Task 3

Knowledge is power! Let's see if you can apply your new-found understanding of probability to improve your chances of winning. Change the dice or dice roller to roll two twelve-sided or two twenty-sided dice. If you have physical dice that are this size, use these or the dice roller.

Think carefully about which winning sum you will choose. Play proceeds as in the previous game.

Instructions

- This is a game played with two twelve or twenty-sided dice.
- Each player, in a clockwise direction, chooses a sum as their winning roll.
- Every player after the first player may choose to swap numbers with any player before them. The player who has their number taken gets to choose another sum – it may not be a sum that is already taken.
- Every player must have a different winning sum.
- Once each player has chosen their sum, then the game begins with the last player who chose rolling first.
- Play proceeds in an anticlockwise direction. If a player rolls their winning sum, they are the winner of the round otherwise the next player (anticlockwise) rolls and play continues until one player rolls their winning sum. The winning sum is recorded on the table.
- Each round begins with players choosing a new sum. The winner of the last round must choose first.
- To find an overall winner add each player's winning rolls to get an overall total.
- The highest overall score wins.

Make a table similar to the one you used in Task 1 that includes all of the possible sums for your two dice. Play 10 rounds and record the winning sum each time in the following table.

Player	**Winning Sum**										**Overall Score**
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11……..**	

Variation:

Play the **Misère** version. In this version of the game, the winning player is the player who has the *lowest* overall score after ten rounds. However, you cannot win with an overall score of 0. You will need to think strategically about your choice of the winning sum in each round, and whether you should swap your sum with another player.