

Challenge 331: Who Wins?

In a game played with a fair cubical die with faces numbered 1 to 6, players take it in turns to throw the die.

The first player to throw the die chooses one of the possible scores to be a “winning score”. If they get that score on their throw, they win and the game is over.

If their score does not come up, the die is given to the second player, who chooses two of the possible scores to be “winning scores”. If they get one of those scores with their throw, they win and the game is over.

If neither of their scores comes up, the die is given to the next player, who chooses three of the possible scores to be “winning scores”. If they get one of those scores with their throw, they win and the game is over.

The game continues in this way with one more “winning score” allowed for each successive throw.

(i) Jem and Tim play this game, taking it in turns to throw the die, with Jem going first. Who is more likely to win this game, Jem or Tim? Provide evidence to support your answer

(ii) Sam comes to join Jem and Tim, so now the game is played by three people, still taking it in turns to throw. Which player will have the best chance of winning if they throw in the order Jem, Tim, Sam? Again, provide evidence!