

1. In the worst case, how many guesses would it our guessing game take to get the right answer if we had no hints at all? Explain.

If there are no hints at all, the player would need to guess each number one by one until they find the correct number. The worst-case scenario would be when the correct number is the last one the player guesses. Since the guessing range is from 1 to 10, the worst-case scenario would be guessing 10 times.

2. In the worst case, how many guesses does it take to get the right number if we get a hint of "higher or lower" when guessing numbers 1-10 **and** guess intelligently (always picking in the middle of the remaining set of numbers)?

If the player guesses smartly by picking the middle of the remaining set of numbers after each hint, they can leverage a binary search strategy. In the worst case, the player might have to guess until the last possible option. This can be modelled by the logarithmic function to the base 2, where the base represents the number of options at each step. The formula would be: $\log_2(\text{Number of Options})$. There are 10 options, and the worst case is $\log_2(10)$ guesses. And the result is 3.32. So you need to do 4 guesses in the worst case.