

# Two dice: predict, roll, compare

Use two fair six-sided dice, a tray and a pencil. Distinguish the dice as A and B (for example, by colour). The model assumes independent outcomes: one die does not affect the other, and successive rolls are independent too.

Agree before starting: if either die lands outside the tray or on an edge, reroll BOTH dice; that attempt is not a recorded roll. Otherwise count every roll, including repeated sums.

Before rolling, predict the most frequent sum: \_\_\_\_\_

## 1. Record the sum of each of 36 rolls

Roll both dice together. Add  $A + B$  and write the sum (2-12) in the next numbered box.

|             |             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|-------------|
| 01<br>_____ | 02<br>_____ | 03<br>_____ | 04<br>_____ | 05<br>_____ | 06<br>_____ |
| 07<br>_____ | 08<br>_____ | 09<br>_____ | 10<br>_____ | 11<br>_____ | 12<br>_____ |
| 13<br>_____ | 14<br>_____ | 15<br>_____ | 16<br>_____ | 17<br>_____ | 18<br>_____ |
| 19<br>_____ | 20<br>_____ | 21<br>_____ | 22<br>_____ | 23<br>_____ | 24<br>_____ |
| 25<br>_____ | 26<br>_____ | 27<br>_____ | 28<br>_____ | 29<br>_____ | 30<br>_____ |
| 31<br>_____ | 32<br>_____ | 33<br>_____ | 34<br>_____ | 35<br>_____ | 36<br>_____ |

## 2. Count your results and compare

Fill the middle row from your 36 recorded sums. Its entries should add up to 36. To compare with the probabilities, divide each observed count by 36.

| Sum          | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |
|--------------|------|------|------|------|------|------|------|------|------|------|------|
| Times rolled |      |      |      |      |      |      |      |      |      |      |      |
| Probability  | 1/36 | 2/36 | 3/36 | 4/36 | 5/36 | 6/36 | 5/36 | 4/36 | 3/36 | 2/36 | 1/36 |

Which sum occurred most often? Were any sums tied?

These probabilities describe fair, independent dice. Six ways out of 36 give a sum of 7, so its probability is  $6/36$ . This does not promise exactly six 7s in 36 rolls. Small samples fluctuate; 36 rolls cannot establish that a die is unfair.

Print on A4 or Letter using "Fit". Exact print size is not required.

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