

# Sample Space Diagrams

ANSWERS

1

Two fair dice are rolled. The scores are added.  
Find the probability that the total is 8.

| + | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5  | 6  | 7  |
| 2 | 3 | 4 | 5 | 6  | 7  | 8  |
| 3 | 4 | 5 | 6 | 7  | 8  | 9  |
| 4 | 5 | 6 | 7 | 8  | 9  | 10 |
| 5 | 6 | 7 | 8 | 9  | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

5 out of 36

$$\frac{5}{36}$$

Answer

2

Two fair dice are rolled. The scores are added.  
Find the probability that the total is 10.

| + | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5  | 6  | 7  |
| 2 | 3 | 4 | 5 | 6  | 7  | 8  |
| 3 | 4 | 5 | 6 | 7  | 8  | 9  |
| 4 | 5 | 6 | 7 | 8  | 9  | 10 |
| 5 | 6 | 7 | 8 | 9  | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

3 out of 36

$$\frac{3}{36} = \frac{1}{12}$$

Answer

3

A fair spinner numbered 1 to 4 is spun and a fair dice is rolled. The scores are added.  
Find the probability that the total is 7.

| + | 1 | 2 | 3 | 4 | 5 | 6  |
|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7  |
| 2 | 3 | 4 | 5 | 6 | 7 | 8  |
| 3 | 4 | 5 | 6 | 7 | 8 | 9  |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |

4 out of 24

$$\frac{4}{24} = \frac{1}{6}$$

Answer

4

Two fair dice are rolled.  
The scores are multiplied.  
Find the probability that the product is 12.

| × | 1 | 2  | 3  | 4  | 5  | 6  |
|---|---|----|----|----|----|----|
| 1 | 1 | 2  | 3  | 4  | 5  | 6  |
| 2 | 2 | 4  | 6  | 8  | 10 | 12 |
| 3 | 3 | 6  | 9  | 12 | 15 | 18 |
| 4 | 4 | 8  | 12 | 16 | 20 | 24 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 |

4 out of 36

$$\frac{4}{36} = \frac{1}{9}$$

Answer

5

Two fair spinners, each numbered 1 to 5, are spun. The scores are subtracted, smaller from bigger.  
Find the probability that the difference is 2.

| - | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 | 0 | 1 | 2 | 3 | 4 |
| 2 | 1 | 0 | 1 | 2 | 3 |
| 3 | 2 | 1 | 0 | 1 | 2 |
| 4 | 3 | 2 | 1 | 0 | 1 |
| 5 | 4 | 3 | 2 | 1 | 0 |

6 out of 25

$$\frac{6}{25}$$

Answer

6

A fair spinner numbered 1 to 3 is spun and a fair dice is rolled. The scores are multiplied.  
Find the probability that the product is even.

| × | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 1 | 2 | 3 | 4  | 5  | 6  |
| 2 | 2 | 4 | 6 | 8  | 10 | 12 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 |

12 out of 18

$$\frac{12}{18} = \frac{2}{3}$$

Answer

7

Two fair dice are rolled. The scores are added.  
Find the probability that the total is more than 9.

| + | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5  | 6  | 7  |
| 2 | 3 | 4 | 5 | 6  | 7  | 8  |
| 3 | 4 | 5 | 6 | 7  | 8  | 9  |
| 4 | 5 | 6 | 7 | 8  | 9  | 10 |
| 5 | 6 | 7 | 8 | 9  | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

6 out of 36

$$\frac{6}{36} = \frac{1}{6}$$

Answer

8

Two fair dice are rolled. The scores are subtracted, smaller from bigger.  
Find the probability that the difference is 0.

| - | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 2 | 1 | 0 | 1 | 2 | 3 | 4 |
| 3 | 2 | 1 | 0 | 1 | 2 | 3 |
| 4 | 3 | 2 | 1 | 0 | 1 | 2 |
| 5 | 4 | 3 | 2 | 1 | 0 | 1 |
| 6 | 5 | 4 | 3 | 2 | 1 | 0 |

6 out of 36

$$\frac{6}{36} = \frac{1}{6}$$

Answer

# Sample Space Diagrams *further practice*

ANSWERS

9



A fair spinner numbered 1 to 5 and a fair spinner numbered 1 to 4 are spun. The scores are added. Complete the grid. Find the probability that the total is 6.

| + | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 2 | 3 | 4 | 5 | 6 |
| 3 | 4 | 5 | 6 | 7 |
| 4 | 5 | 6 | 7 | 8 |
| 5 | 6 | 7 | 8 | 9 |

Answer  $\frac{4}{20} = \frac{1}{5}$

10



A fair coin is flipped and a fair dice is rolled. List every outcome in the grid, for example H1. Find the probability of getting a head and an even number.

|   | 1  | 2  | 3  | 4  | 5  | 6  |
|---|----|----|----|----|----|----|
| H | H1 | H2 | H3 | H4 | H5 | H6 |
| T | T1 | T2 | T3 | T4 | T5 | T6 |

Answer  $\frac{3}{12} = \frac{1}{4}$

11



Two fair dice are rolled and the scores are added. Find the probability that the total is 9 or more.

| + | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5  | 6  | 7  |
| 2 | 3 | 4 | 5 | 6  | 7  | 8  |
| 3 | 4 | 5 | 6 | 7  | 8  | 9  |
| 4 | 5 | 6 | 7 | 8  | 9  | 10 |
| 5 | 6 | 7 | 8 | 9  | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

Answer  $\frac{10}{36} = \frac{5}{18}$

12



Two fair spinners are spun and the scores are added. Some of the scores are missing. Complete the grid. Find the probability that the total is 8.

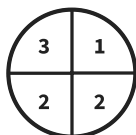
| + | 2 | 3 | 5  | 7  |
|---|---|---|----|----|
| 1 | 3 | 4 | 6  | 8  |
| 3 | 5 | 6 | 8  | 10 |
| 5 | 7 | 8 | 10 | 12 |

Answer  $\frac{3}{12} = \frac{1}{4}$

13



In a board game you spin this fair spinner and roll a fair dice. The scores are multiplied. Find the probability that the score is 6.



| × | 1 | 2 | 3 | 4  | 5  | 6  |
|---|---|---|---|----|----|----|
| 1 | 1 | 2 | 3 | 4  | 5  | 6  |
| 2 | 2 | 4 | 6 | 8  | 10 | 12 |
| 2 | 2 | 4 | 6 | 8  | 10 | 12 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 |

Answer  $\frac{4}{24} = \frac{1}{6}$

14



Mo and Ella roll two fair dice and multiply the scores. Mo wins if the answer is odd. Ella wins if it is even. Is the game fair? Show how you know.

| × | 1 | 2  | 3  | 4  | 5  | 6  |
|---|---|----|----|----|----|----|
| 1 | 1 | 2  | 3  | 4  | 5  | 6  |
| 2 | 2 | 4  | 6  | 8  | 10 | 12 |
| 3 | 3 | 6  | 9  | 12 | 15 | 18 |
| 4 | 4 | 8  | 12 | 16 | 20 | 24 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 |

$$P(\text{odd}) = \frac{9}{36}, P(\text{even}) = \frac{27}{36}$$

Answer *No*

15



At a fair, a game is won when two fair dice show the same number. 180 people play the game once each. How many winners would you expect?

|   | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | ✓ |   |   |   |   |   |
| 2 |   | ✓ |   |   |   |   |
| 3 |   |   | ✓ |   |   |   |
| 4 |   |   |   | ✓ |   |   |
| 5 |   |   |   |   | ✓ |   |
| 6 |   |   |   |   |   | ✓ |

$$\frac{6}{36} \times 180 = 30$$

Answer *30 winners*

16



Two fair dice are rolled and the scores are added. Sam says there are 11 possible totals, 2 to 12, so the probability of a total of 7 is  $\frac{1}{11}$ . Explain why Sam is wrong.

*the totals are not equally likely: 7 can be made 6 ways, 2 only 1 way*

Answer  $P(7) = \frac{1}{6}$