

Sample Spaces

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Two coins are flipped. List the outcomes and find P(one head and one tail).

Step 1 · Fix the first coin, change the second

HH, HT, TH, TT

Step 2 · Count the outcomes with one of each

HT and TH: 2 outcomes

Step 3 · Probability

$$2/4 = 1/2$$

Answer: HH, HT, TH, TT; P = 1/2

Check: HT (head first) and TH (tail first) really are different — try it with a 10p and a 2p coin ✓

2. Now try one with the steps

Two fair dice are rolled and the scores added. Find P(total of 7).

Step 1 · Draw the 6 × 6 sample space

Step 2 · Find totals of 7

Step 3 · Probability

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. A coin is flipped and a dice is rolled. How many outcomes are there? [1]

2. List all the outcomes when two coins are flipped. [1]

3. Two dice are rolled. How many outcomes are there in the sample space? [1]

4. Two fair dice are rolled and the scores added. Find $P(\text{total of } 12)$. [1]
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5. Two fair dice are rolled. Find $P(\text{a double})$. [1]
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6. Two fair dice are rolled and the scores added. Find $P(\text{total of } 8)$. [1]
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7. Two spinners, each numbered 1 to 4, are spun. How many outcomes are there? [1]
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8. Two fair dice are rolled and the scores added. Which total is most likely? [1]
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9. Two fair dice are rolled and the scores added. Find $P(\text{total greater than } 9)$. [2]
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10. Two spinners numbered 1 to 4 are spun and the numbers multiplied. Find $P(\text{the product is even})$. [2]
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11. Kemi has 3 T-shirts and 4 pairs of shorts. How many different outfits of one T-shirt and one pair of shorts can she make? [1]
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12. Three coins are flipped. How many outcomes are there? [1]
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13. Three fair coins are flipped. Find $P(\text{exactly two heads})$. [2]
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14. Two fair dice are rolled. Find $P(\text{the difference between the scores is } 2)$. [2]
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15. A 3-digit code uses only the digits 1, 2, 3 and 4, and digits can be repeated. How many different codes are possible? [2]

4. Before you hand it in

Two coins: the outcomes are 'two heads, two tails, one of each', so $P(\text{one of each}) = 1/3$

There are four equally likely outcomes: HH, HT, TH, TT. 'One of each' happens in two of them, so $P = 2/4 = 1/2$.

Listing outcomes in a random order and missing some

Fix the first item, run through every option for the second, then change the first. A grid makes this automatic.

Thinking every total from 2 to 12 is equally likely with two dice

The 36 OUTCOMES are equally likely, not the 11 totals. A total of 7 can happen in 6 ways but 12 in only 1.

3 T-shirts and 4 shorts make $3 \times 4 = 12$ outfits

Each T-shirt can go with each pair of shorts: $3 \times 4 = 12$ outfits.