Work out the probability that a person chosen at random is:

(i) female, (ii) not wearing glasses

(iii) a male who wears glasses

17. This table shows the way that fifty red and blue counters are numbered either 1 or 2.
One of the counters is chosen at random.
What is the probability that the counter is:

	Red	Blue
1	12	8
2	8	22

(i) a 1 (ii) blue (iii) blue and a 1?

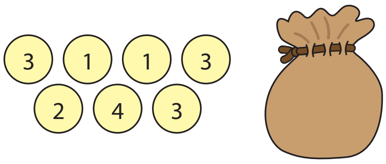
A blue counter is chosen at random.

(iv) What is the probability that the counter is a 1?

A counter numbered 1 is chosen at random.

(v) What is the probability that it is blue?

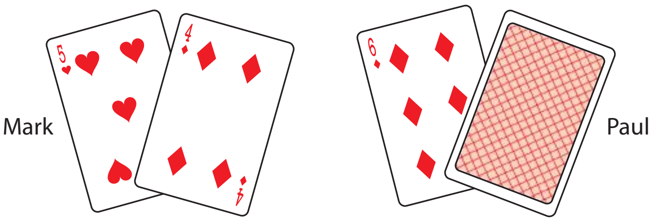
18. Mick put these numbered discs in a bag.



(i) He shakes the bag and takes one disc without looking.
What is the probability of getting a 2?

(ii) Mick wants to put more discs in the bag so that the chance of getting a 4 is twice the chance of getting a 3.
What discs should he put in the bag?

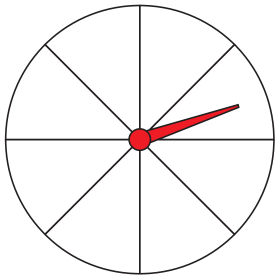
19. Mark played a card game with Paul. The cards were dealt so that both players received two cards. Mark's cards were a five and a four. Paul's first card was a six.



Find the probability that Paul's second card was

(i) a five (ii) a picture card [a King, Queen or Jack].

20. The circle on the right is divided into eight equal sectors.
Copy this diagram and in the sectors mark the letters R(red), G(green) or B(blue) so that when a spinner is spun, the probability of getting blue is $\frac{1}{4}$ and the probability of getting red will be twice the probability of getting green.



Section 6.3 Two events – Use of sample spaces

When two coins are tossed, the set of possible outcomes is

{*HH*, *HT*, *TH*, *TT*}, where H = head and T = tail.

This set of possible outcomes is called a **sample space**.

By using this sample space, we can write down the probability of getting 2 heads, for example.

$P(HH) = \frac{1}{4}$

$P(\text{one head and one tail}) = \frac{2}{4} = \frac{1}{2}$

An experiment such as throwing two dice has a large number of possible outcomes, so we need to set out the sample space in an organised way, as shown in the following example.

Example 1

If two dice are thrown and the scores are added, set out a sample space giving all the possible outcomes. Find the probability that

(i) the total is exactly 7

(ii) the total is 4 or less

(iii) the total is 11 or more

(iv) the total is a multiple of 5.

The sample space is set out on the right.

There are 36 outcomes.

	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

(i) There are 6 totals of 7.

$\Rightarrow \quad P(7) = \frac{6}{36} = \frac{1}{6}$

(ii) There are 6 totals of 4 or less.

$\Rightarrow \quad P(\text{4 or less}) = \frac{6}{36} = \frac{1}{6}$

(iii) There are 3 totals of 11 or more.

$\Rightarrow \quad P(\text{11 or more}) = \frac{3}{36} = \frac{1}{12}$

(iv) The multiples of 5 are 5 and 10.

There are 7 totals of 5 or 10.

$\Rightarrow \quad P(\text{multiple of 5}) = \frac{7}{36}$

Exercise 6.3

1. A fair coin is tossed and a fair dice is thrown.

The table below shows all the possible outcomes.

		Dice					
		1	**2**	**3**	**4**	**5**	**6**
Coin	**Head (*H*)**	*H*, 1	*H*, 2	*H*, 3	*H*, 4	*H*, 5	*H*, 6
	Tail (*T*)	*T*, 1	*T*, 2	*T*, 3	*T*, 4	*T*, 5	*T*, 6

Write down the probability of getting each of these outcomes:

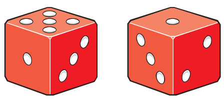
(i) a head and a 5

(ii) a tail and an even number

(iii) a tail and 3 or greater

(iv) a head and a multiple of 3.

2. Two dice are thrown and the scores obtained are added. The resulting outcomes are shown in the given sample space.
Find the probability that the sum of the two numbers is



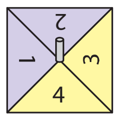
6	7	8	9	10	11	12
5	6	7	8	9	10	11
4	5	6	7	8	9	10
3	4	5	6	7	8	9
2	3	4	5	6	7	8
1	2	3	4	5	6	7
	1	2	3	4	5	6

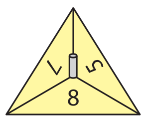
(i) 9   (ii) 10
(iii) 3 or less   (iv) 10 or 11.

3. Three coins are tossed, each toss resulting in a head (H) or a tail(T).
Make out a sample space for the possible results and write down the probability that the coins show

(i) *HHH*
(ii) *HTH* in that order
(iii) 2 heads and 1 tail in any order.

4. You play a game with two spinners, as shown.
They are spun at the same time and the scores are added.
Make out a sample space for the possible results and write down the probability of getting a total of





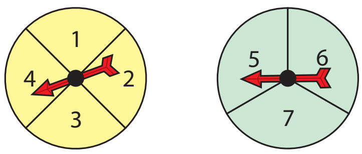
(i) 6   (ii) 10   (iii) an even number

Which score do you get most often?
Hence write down the probability of getting this score.

5. Of three cards, two are blue and one is red. The three cards are placed side by side, in random order, on a table. One of these ways is B R B

List all the other ways that the cards could be placed and write down the probability that the two blue cards are next to each other.

6. The arrows on both these spinners are spun.



(i) Make a list to show all the possible outcomes, e.g., (1, 5), (1, 6), …
(ii) How many outcomes are there altogether?
(iii) What is the probability that
  (a) both arrows point to an odd number
  (b) both point to an even number
  (c) the two numbers, to which the arrows are pointing, add up to 8?