Probability 2

07 November 2019 10:54

T&T2 10.3 Probability...

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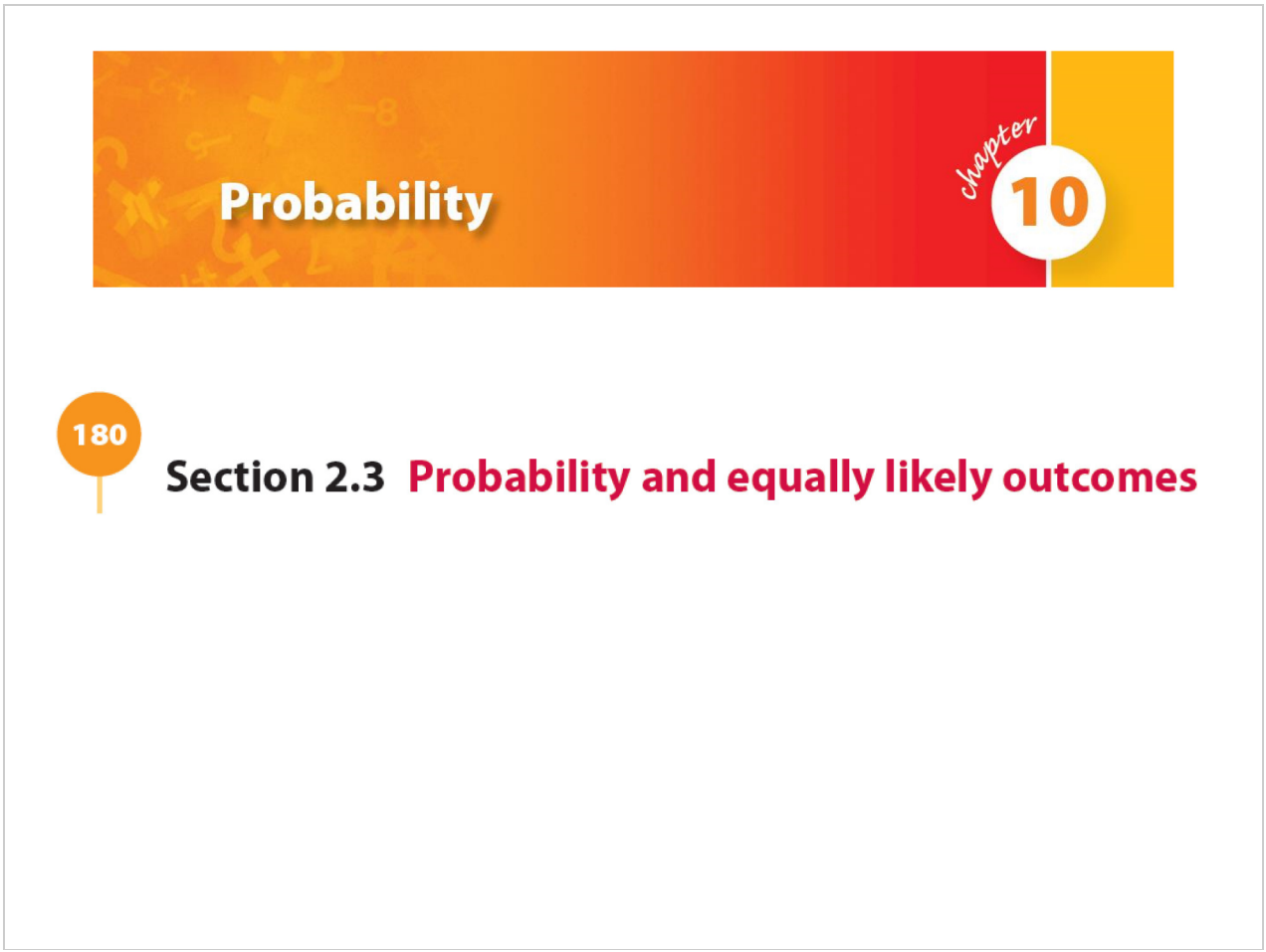


Example 1

Below is a number of lettered tiles.

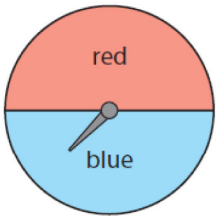
One of these tiles is selected at random.
Work out the probability of getting:

(i) an A (ii) an L (iii) an O
(iv) an A or an L (v) an A or an O (vi) an L or an O

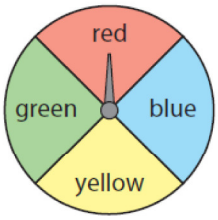
Exercise 10.3

1. (i) State the sample space for each of these spinners:

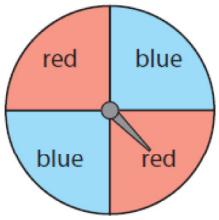
(a)



(b)



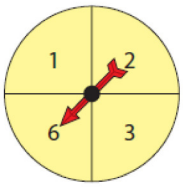
(c)



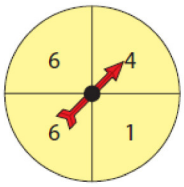
(ii) For each of the spinners, write down the probability that the spinner ends on red.

2. What is the probability of getting a 6 on each of these spinners?

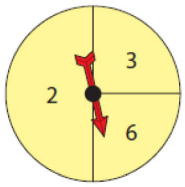
(i)



(ii)

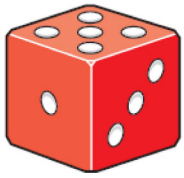


(iii)



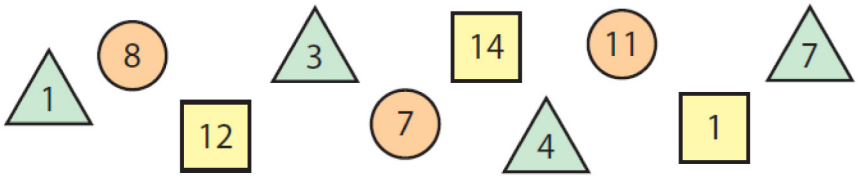
What is the probability of getting a 2 or a 6 on spinner (iii)?

3. A fair dice is rolled.
What is the probability of getting



(i) a 5
(ii) a 1 or a 2
(iii) 4 or more
(iv) an odd number
(v) less than 3
(vi) a prime number?

4. Here is a number of shapes.



One of these shapes is chosen at random. Work out the probability that the shape will be:

(i) a square (ii) a triangle (iii) a square or a triangle
(iv) an odd number (v) a 2-digit number (vi) a green odd number.

5. A letter is chosen at random from the word *PROBABILITY*. = 11
Write down the probability that it will be a,e,i,o,u

(i) *A* (ii) *B* (iii) *I* (iv) a vowel (v) a *B* or an *I*.

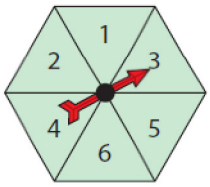
$P(A) = \frac{1}{11}$ $P(B) = \frac{2}{11}$ $P(I) = \frac{2}{11}$ $P(\text{vowel}) = \frac{4}{11}$ $P(B)\frac{2}{11}$ OR $P(I)\frac{2}{11}$

$\frac{2}{11} + \frac{2}{11} = \frac{4}{11}$

6. For each of the following spinners, find the probability that the outcome of one spin will be a four. 4 as a result

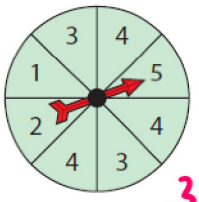
6. For each of the following spinners, find the probability that the outcome of one spin will be a four.

(i)



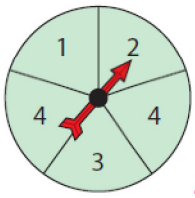
$P(4) = \frac{1}{6}$

(ii)



$P(4) = \frac{3}{8}$

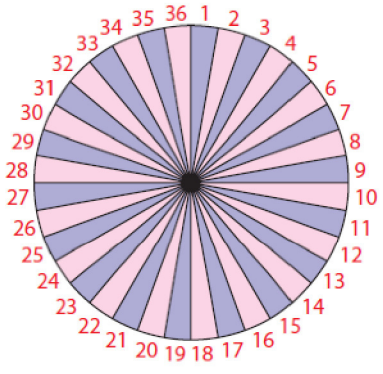
(iii)



$P(4) = \frac{2}{5}$

7. A dart board has 36 sectors, labelled 1 to 36. Determine the probability that a dart thrown at the board hits:

(i) a multiple of 4
(ii) a number between 6 and 9 inclusive 6, 7, 8, 9
(iii) a number greater than 20
(iv) 9
(v) a multiple of 13
(vi) an odd number that is a multiple of 3.



i) 4, 8, 12, 16, 20, 24, 28, 32, 36 $\frac{9}{36} = \frac{1}{4}$

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

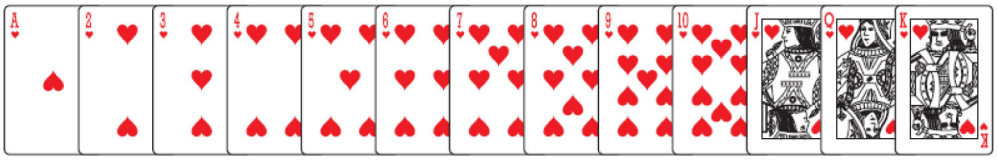
iii) $P(<20) = 4/9$

iv) $1/36$

v) 13, 26 $= \frac{2}{36} = \frac{1}{18}$

vi) 3, 9, 15, 21, 27, 33 $\frac{6}{36} = \frac{1}{6}$.

8. A standard pack of cards has 4 suits; hearts (♥), diamonds (♦), clubs (♣) and spades (♠). There are 13 cards in each suit and 52 cards altogether.



The first of these cards is called an **Ace**. The last three cards are the *picture* or *court* cards: the **Jack**, the **Queen** and the **King**.

From the 13 cards shown above, one card is to be chosen at random. What is the probability that the card chosen will be:

(i) the 7 (ii) the Ace (iii) a picture card

(iv) a heart (v) a spade (vi) either a 9 or a 10?

9. From a standard pack of 52 cards, a card is chosen at random.
What is the probability that the card will be:

(i) a diamond (ii) a red card (iii) a black card

(iv) a 3 (v) a picture card (vi) either an Ace or a King?

10. A box contains twelve green marbles, six blue marbles and eight white marbles.
A marble is selected at random.
What is the probability that the marble selected is:

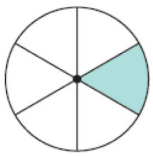
(i) green or white
(ii) blue or white
(iii) not green
(iv) orange?

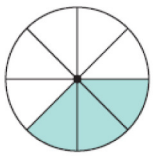
11. A square dart board is divided into sixteen smaller squares. Fourteen of the squares are painted as shown.

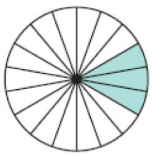
(i) What colour(s) should the remaining squares be painted so that the probability of landing on red is $\frac{3}{8}$ and it is impossible to land on black?
(ii) What colour(s) should the remaining squares be painted so that the probability of landing on red is twice the probability of landing on blue?

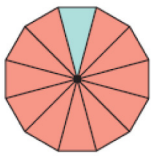
red	yellow	red	blue
white	red	white	blue
red	blue	white	red
white	yellow	?	?

12. What is the probability that the pointer of these spinners lands in the blue section?

(i) 

(ii) 

(iii) 

(iv) 

13. Design a spinner for which the probability of the pointer landing in the blue section is:

(i) half

(ii) less than half

(iii) three times as likely as on red

14. Assuming that a person is equally likely to be born on any day of the week or in any month of the year, what is the probability that a randomly-chosen person has his/her birthday

(i) on a Tuesday

(ii) on a Saturday or Sunday

(iii) in January or February?

15. A bag contains five red discs with the numbers 1 to 5 painted on them and seven blue discs painted with the numbers 1 to 7. If a disc is chosen at random, what is the probability of choosing

(i) a red disc

(ii) a disc numbered 3

(iii) a disc numbered 6

(iv) the blue disc numbered 1

(v) an even numbered disc

(vi) an odd numbered disc?

Explain why the probabilities in (v) and (vi) sum to 1.

16. In a pre-election poll of 400 people, 120 supported the A party, 140 supported the B party and the rest were undecided. If a person is selected at random from this group, what is the probability that they:

(i) support the A party
(ii) support the B party
(iii) support a party
(iv) are undecided?

17. At the end of a Summer Camp, 50 boys and girls were asked to name their favourite game at the camp. The results are given in the table below:

	Tennis	Basketball	Volleyball
Girls	15	10	5
Boys	6	12	2

If a person was selected at random from the group of 50, find the probability that the person

(i) was a boy
(ii) was a girl who named tennis as her favourite game
(iii) named basketball as her/his favourite game.

If a girl was selected, find the probability that she had named volleyball as her favourite game.

18. Of 100 tickets sold in a raffle, Luke bought 10, Heather bought 5 and Alan bought 1.
A ticket was chosen at random to determine who won the prize.
What is the probability that the prize was won by:

(i) Alan (ii) Luke

(iii) Heather (iv) none of these three people?

How many of the 100 tickets would I need to buy for the probability of my winning to be:

(v) $\frac{3}{10}$ (vi) 0.2 (vii) 25% (viii) 100%?

19. There are 8 counters in a box.
The probability of taking a green counter out of the box is $\frac{1}{2}$.
A green counter is taken out of the box and put to one side.
Gerry now takes a counter at random from the box.
What is the probability it is green?

20. A game is played by picking a card at random from a pack of 52 playing cards.
The table shows the results of picking various cards.

Card	Result
Ace	Win €2
K, Q or J	Win 50c
6, 7, 8, 9, 10	No result
2, 3, 4, 5	Lose 50c

If Eileen picks a card, what is the probability that she will

(i) lose money (ii) win money

(iii) neither win nor lose (iv) not lose money?

21. This table shows information about a group of children.

	Boys	Girls
Blue eyes	3	6
Brown eyes	12	9

(i) How many children are in the group altogether?

(ii) If a child is chosen from the group at random, what is the probability of that child

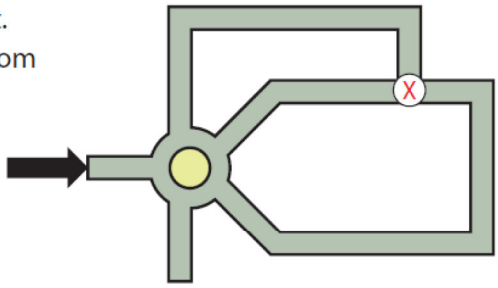
(a) having blue eyes (b) being a boy?

(iii) If a boy is chosen from the group, what is the probability that he has blue eyes?

22. Naomi approaches a roundabout from the west. She chooses one of the other exit roads at random when leaving the roundabout.

(i) What is the probability that she chooses the dead end?

(ii) What is the probability that she chooses a road that leads to (X)?



Answers

Exercise 10.3

1. (i) (a) Red, blue
(b) Red, blue, yellow, green
(c) Red, blue
(ii) (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$

2. (i) $\frac{1}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{4}$; $\frac{3}{4}$

3. (i) $\frac{1}{6}$ (ii) $\frac{1}{3}$ (iii) $\frac{1}{2}$ (iv) $\frac{1}{2}$ (v) $\frac{1}{3}$ (vi) $\frac{1}{2}$

4. (i) $\frac{3}{10}$ (ii) $\frac{2}{5}$ (iii) $\frac{7}{10}$ (iv) $\frac{3}{5}$ (v) $\frac{3}{10}$ (vi) $\frac{3}{10}$

5. (i) $\frac{1}{11}$ (ii) $\frac{2}{11}$ (iii) $\frac{2}{11}$ (iv) $\frac{4}{11}$ (v) $\frac{4}{11}$

6. (i) $\frac{1}{6}$ (ii) $\frac{3}{8}$ (iii) $\frac{2}{5}$

7. (i) $\frac{1}{4}$ (ii) $\frac{1}{9}$ (iii) $\frac{4}{9}$ (iv) $\frac{1}{36}$ (v) $\frac{1}{18}$ (vi) $\frac{1}{6}$

8. (i) $\frac{1}{13}$ (ii) $\frac{1}{13}$ (iii) $\frac{3}{13}$ (iv) 1 (v) 0 (vi) $\frac{2}{13}$

9. (i) $\frac{1}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{2}$ (iv) $\frac{1}{13}$ (v) $\frac{3}{13}$ (vi) $\frac{2}{13}$

10. (i) $\frac{10}{13}$ (ii) $\frac{7}{13}$ (iii) $\frac{7}{13}$ (iv) 0

Answers

11. (i) Red and any colour other than red or black

(ii) Red and any colour other than red or blue

12. (i) $\frac{1}{6}$ (ii) $\frac{3}{8}$ (iii) $\frac{1}{6}$ (iv) $\frac{1}{12}$

14. (i) $\frac{1}{7}$ (ii) $\frac{2}{7}$ (iii) $\frac{1}{6}$

15. (i) $\frac{5}{12}$ (ii) $\frac{1}{6}$ (iii) $\frac{1}{12}$ (iv) $\frac{1}{12}$ (v) $\frac{5}{12}$

(vi) $\frac{7}{12}$; Every disc is either even or odd, i.e. every outcome covered

16. (i) $\frac{3}{10}$ (ii) $\frac{7}{20}$ (iii) $\frac{13}{20}$ (iv) $\frac{7}{20}$

17. (i) $\frac{2}{5}$ (ii) $\frac{3}{10}$ (iii) $\frac{11}{25}$; $\frac{1}{6}$

18. (i) $\frac{1}{100}$ (ii) $\frac{1}{10}$ (iii) $\frac{1}{20}$ (iv) $\frac{21}{25}$

(v) 30 (vi) 20 (vii) 25 (viii) 100

19. $\frac{3}{7}$

20. (i) $\frac{4}{13}$ (ii) $\frac{4}{13}$ (iii) $\frac{5}{13}$ (iv) $\frac{9}{13}$

21. (i) 30 (ii) (a) $\frac{3}{10}$ (b) $\frac{1}{2}$ (iii) $\frac{1}{5}$

22. (i) $\frac{1}{4}$ (ii) $\frac{3}{4}$