

Probability



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6



For
Examiner's
Use

Prettie picks a card at random from the 11 cards above and does not replace it.
She then picks a second card at random and does not replace it.

- (a) Find the probability that she picks
- (i) the letter L and then the letter G,

Answer(a)(i) [2]

- (ii) the letter E twice,

Answer(a)(ii) [2]

- (iii) two letters that are the same.

Answer(a)(iii) [2]

(b) Prettie now picks a third card at random.

Find the probability that the three letters

(i) are all the same,

Answer(b)(i) [2]

(ii) **do not** include a letter E,

Answer(b)(ii) [2]

(iii) include exactly two letters that are the same.

Answer(b)(iii) [5]

5 Solve the equation.

$$5 - 2x = 3x - 19$$

Answer $x =$ [2]

6

S	P	A	C	E	S
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One of the 6 letters is taken at random.

(a) Write down the probability that the letter is S.

Answer(a) [1]

(b) The letter is replaced and again a letter is taken at random.
This is repeated 600 times.

How many times would you expect the letter to be S?

Answer(b) [1]

7 The length, p cm, of a car is 440 cm, correct to the nearest 10 cm.

Complete the statement about p .

Answer $\leq p <$ [2]

21 In this question, give all your answers as fractions.

A box contains 3 red pencils, 2 blue pencils and 4 green pencils.
Raj chooses 2 pencils at random, without replacement.

Calculate the probability that

(a) they are both red,

Answer(a) [2]

(b) they are both the same colour,

Answer(b) [3]

(c) exactly one of the two pencils is green.

Answer(c) [3]

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- (a) One of these 7 cards is chosen at random.

Write down the probability that the card

- (i) shows the letter A ,

Answer(a)(i) [1]

- (ii) shows the letter A or B ,

Answer(a)(ii) [1]

- (iii) does not show the letter B .

Answer(a)(iii) [1]

- (b) Two of the cards are chosen at random, without replacement.

Find the probability that

- (i) both show the letter A ,

Answer(b)(i) [2]

- (ii) the two letters are different.

Answer(b)(ii) [3]

- (c) Three of the cards are chosen at random, without replacement.

Find the probability that the cards do not show the letter C .

Answer(c) [2]

- 6 (a) A square spinner is biased.
The probabilities of obtaining the scores 1, 2, 3 and 4 when it is spun are given in the table.

Score	1	2	3	4
Probability	0.1	0.2	0.4	0.3

- (i) Work out the probability that on one spin the score is 2 or 3.

Answer(a)(i) [2]

- (ii) In 5000 spins, how many times would you expect to score 4 with this spinner?

Answer(a)(ii) [1]

- (iii) Work out the probability of scoring 1 on the first spin and 4 on the second spin.

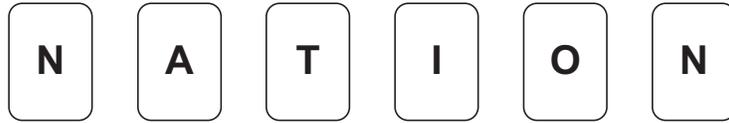
Answer(a)(iii) [2]

- (b) In a bag there are 7 red discs and 5 blue discs.
From the bag a disc is chosen at random and not replaced.
A second disc is then chosen at random.

Work out the probability that at least one of the discs is red.
Give your answer as a fraction.

Answer(b) [3]

6 In this question, give all your answers as fractions.



The letters of the word **NATION** are printed on 6 cards.

(a) A card is chosen at random.

Write down the probability that

(i) it has the letter **T** printed on it,

Answer(a)(i) [1]

(ii) it does not have the letter **N** printed on it,

Answer(a)(ii) [1]

(b) Lara chooses a card at random, replaces it, then chooses a card again.

Calculate the probability that only **one** of the cards she chooses has the letter **N** printed on it.

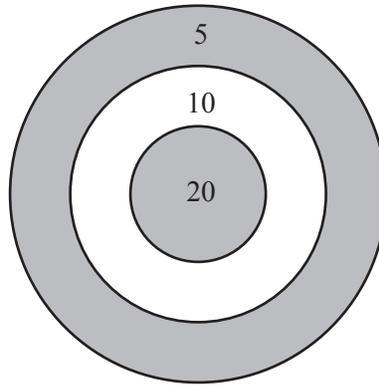
Answer(b) [3]

(c) Jacob chooses a card at random and does not replace it.
He continues until he chooses a card with the letter **N** printed on it.

Find the probability that this happens when he chooses the 4th card.

Answer(c) [3]

- 5 Kiah plays a game.
The game involves throwing a coin onto a circular board.
Points are scored for where the coin lands on the board.



If the coin lands on part of a line or misses the board then 0 points are scored.
The table shows the probabilities of Kiah scoring points on the board with one throw.

Points scored	20	10	5	0
Probability	x	0.2	0.3	0.45

- (a) Find the value of x .

$$x = \dots\dots\dots [2]$$

- (b) Kiah throws a coin fifty times.

Work out the expected number of times she scores 5 points.

$$\dots\dots\dots [1]$$

- (c) Kiah throws a coin two times.

Calculate the probability that

- (i) she scores either 5 or 0 with her first throw,

$$\dots\dots\dots [2]$$

- (ii) she scores 0 with her first throw and 5 with her second throw,

$$\dots\dots\dots [2]$$

11 Gareth has 8 sweets in a bag.
4 sweets are orange flavoured, 3 are lemon flavoured and 1 is strawberry flavoured.

(a) He chooses two of the sweets at random.

Find the probability that the two sweets have different flavours.

Answer(a) [4]

(b) Gareth now chooses a third sweet.

Find the probability that **none** of the three sweets is lemon flavoured.

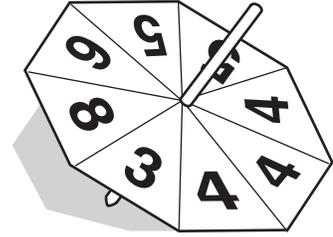
Answer(b) [2]

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- 5 Sandra has a fair eight-sided spinner.
The numbers on the spinner are 3, 4, 4, 4, 5, 5, 6 and 8.
Sandra spins the spinner twice and records each number it lands on.



Find the probability that

- (a) both numbers are 8,

..... [2]

- (b) the two numbers are not both 8,

..... [1]

- (c) one number is odd and one number is even,

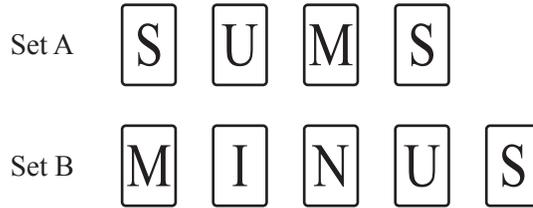
..... [2]

(d) the total of the two numbers is at least 13,

..... [3]

(e) the second number is bigger than the first number.

..... [3]



The diagram shows two sets of cards.

(a) One card is chosen at random from Set A and replaced.

(i) Write down the probability that the card chosen shows the letter M.

Answer(a)(i) [1]

(ii) If this is carried out 100 times, write down the expected number of times the card chosen shows the letter M.

Answer(a)(ii) [1]

(b) Two cards are chosen at random, **without** replacement, from Set A.

Find the probability that both cards show the letter S.

Answer(b) [2]

(c) One card is chosen at random from Set A and one card is chosen at random from Set B.

Find the probability that exactly one of the two cards shows the letter U.

Answer(c) [3]

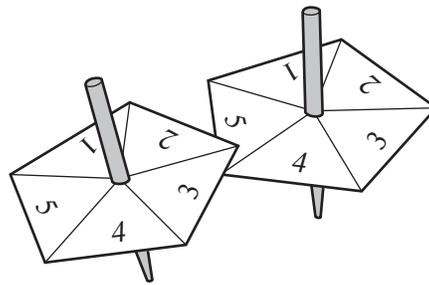
(d) A card is chosen at random, **without** replacement, from Set B until the letter shown is either I or U.

Find the probability that this does not happen until the 4th card is chosen.

Answer(d) [2]

- 12 Two spinners have sections numbered from 1 to 5. Each is spun once and each number is equally likely. The possibility diagram is shown below.

Second spinner	5	+	+	+	+	+
	4	+	+	+	+	+
	3	+	+	+	+	+
	2	+	+	+	+	+
	1	+	+	+	+	+
		1	2	3	4	5
		First spinner				



Find the probability that

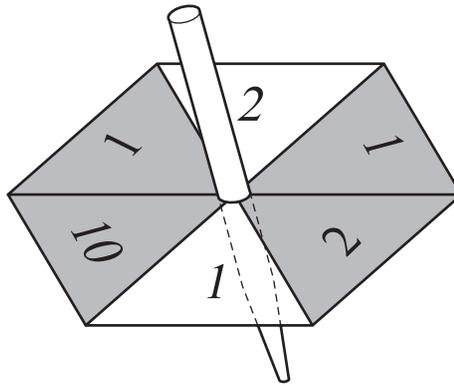
- (a) both spinners show the same number,

Answer(a) [2]

- (b) the sum of the numbers shown on the two spinners is 7.

Answer(b) [2]

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The diagram shows a spinner with six numbered sections.
Some of the sections are shaded.
Each time the spinner is spun it stops on one of the six sections.
It is equally likely that it stops on any one of the sections.

(a) The spinner is spun once.

Find the probability that it stops on

(i) a shaded section,

Answer(a)(i) [1]

(ii) a section numbered 1,

Answer(a)(ii) [1]

(iii) a shaded section numbered 1,

Answer(a)(iii) [1]

(iv) a shaded section or a section numbered 1.

Answer(a)(iv) [1]

(b) The spinner is now spun twice.

Find the probability that the total of the two numbers is

(i) 20,

Answer(b)(i) [2]

(ii) 11.

Answer(b)(ii) [2]

(c) (i) The spinner stops on a shaded section.

Find the probability that this section is numbered 2.

Answer(c)(i) [1]

(ii) The spinner stops on a section numbered 2.

Find the probability that this section is shaded.

Answer(c)(ii) [1]

(d) The spinner is now spun until it stops on a section numbered 2.

The probability that this happens on the n th spin is $\frac{16}{243}$.

Find the value of n .

Answer(d) $n =$ [2]

20 The table shows the probability that a person has blue, brown or green eyes.

Eye colour	Blue	Brown	Green
Probability	0.4	0.5	0.1

Use the table to work out the probability that two people, chosen at random,

(a) have blue eyes,

Answer(a) [2]

(b) have different coloured eyes.

Answer(b) [4]

10 Kenwyn plays a board game.

Two cubes (dice) each have faces numbered 1, 2, 3, 4, 5 and 6.

In the game, a **throw** is rolling the **two** fair 6-sided dice and then adding the numbers on their top faces. This total is the number of spaces to move on the board.

For example, if the numbers are 4 and 3, he moves 7 spaces.

(a) Giving each of your answers as a fraction in its simplest form, find the probability that he moves

(i) two spaces with his next throw,

Answer(a)(i) [2]

(ii) ten spaces with his next throw.

Answer(a)(ii) [3]

(b) What is the most likely number of spaces that Kenwyn will move with his next throw?

Explain your answer.

Answer(b) because

..... [2]

(c)

95	96	97	98	99 Go back 3 spaces	100 WIN
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To win the game he must move **exactly** to the 100th space.

Kenwyn is on the 97th space.

If his next throw takes him to 99, he has to move back to 96.

If his next throw takes him over 100, he stays on 97.

Find the probability that he reaches 100 in either of his next two throws.

Answer(c) [5]
