



EXAM PAPERS PRACTICE

Probability

Question Paper

Question 1

Simon has two boxes of cards.

In one box, each card has one shape drawn on it that is either a triangle or a square.

In the other box, each card is coloured either red or blue.

Simon picks a card from each box at random.

The probability of picking a triangle card is t .

The probability of picking a red card is r .

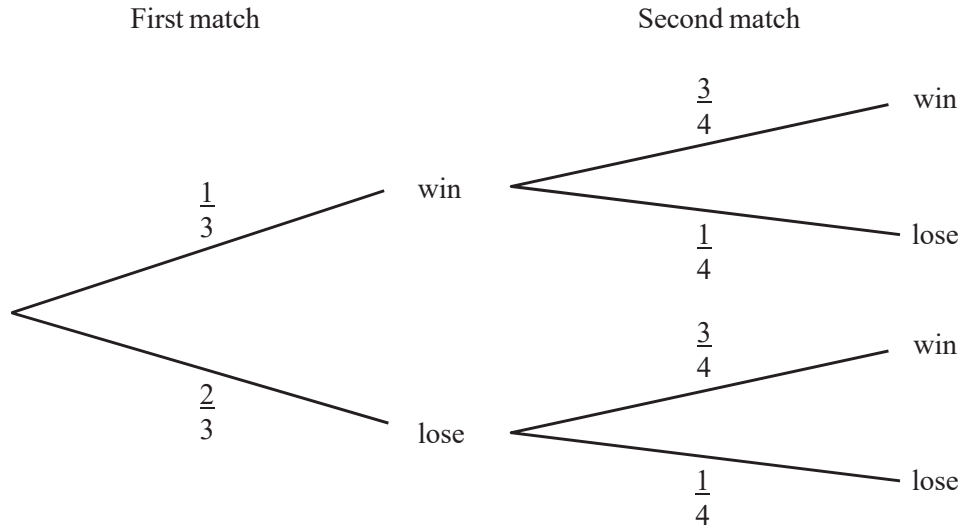
Complete the table for the cards that Simon picks, writing each probability in terms of r and t .

Event	Probability
Triangle and red	
Square and red	$(1 - t)r$
Triangle and blue	
Square and blue	

[3]

Question 2

The probability of a cricket team winning or losing in their first two matches is shown in the tree diagram.



Find the probability that the cricket team wins at least one match.

[3]

Question 3

Hattie has a box of coloured pens.
She takes a pen at random from the box.
The probability that she takes a red pen is 0.4 .

(a) Work out the probability that she does not take a red pen.

[1]

(b) The box contains only blue, red and green pens.
There are 15 blue pens and 15 green pens.

Complete the table.

Colour of pen	Blue	Red	Green
Number of pens	15		15
Probability		0.4	

[2]

Question 4

Dan either walks or cycles to school.
The probability that he cycles to school is $\frac{1}{3}$.

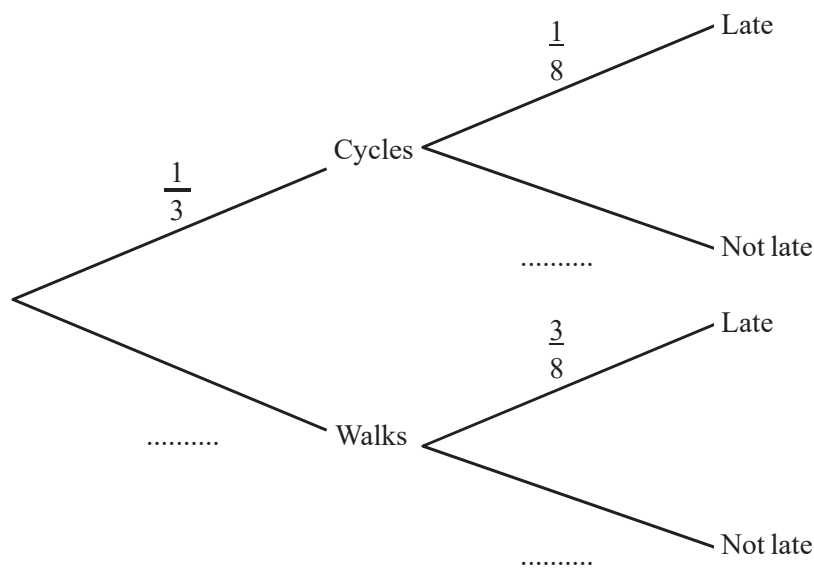
(a) Write down the probability that Dan walks to school.

[1]

(b) When Dan cycles to school the probability that he is late is $\frac{1}{8}$.

When Dan walks to school the probability that he is late is $\frac{3}{8}$.

Complete the tree diagram.



[2]

(c) Calculate the probability that

(i) Dan cycles to school and is late,

[2]

(ii) Dan is not late.

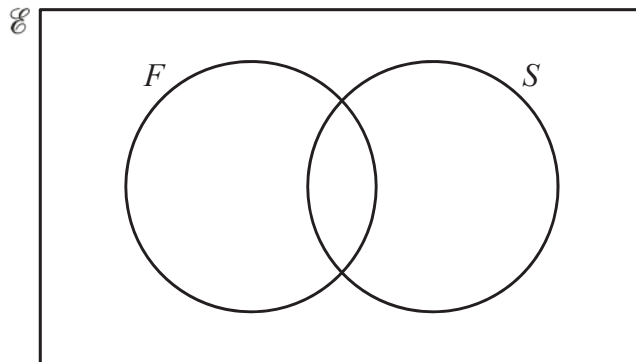
[3]

Question 5



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(a) In this part, you may use this Venn diagram to help you answer the questions.



In a class of 30 students, 25 study French (F), 18 study Spanish (S).
One student does not study French or Spanish.

(i) Find the number of students who study French and Spanish.

[2]

(ii) One of the 30 students is chosen at random.

Find the probability that this student studies French but not Spanish.

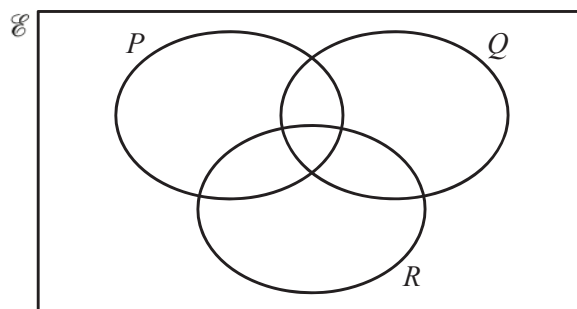
[1]

(iii) A student who does not study Spanish is chosen at random.

Find the probability that this student studies French.

[1]

(b)



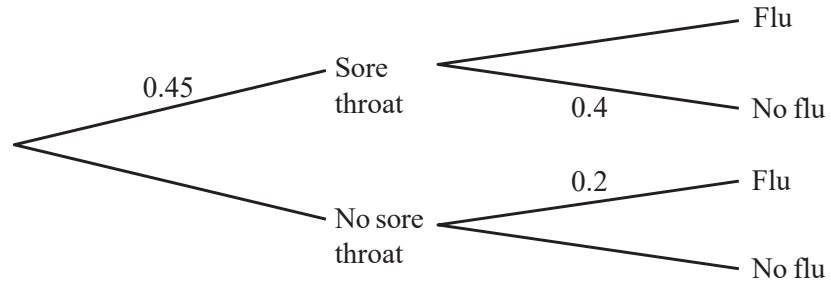
On this Venn diagram, shade the region $R \cap (P \cup Q)'$.

[1]

Question 6



In a flu epidemic 45% of people have a sore throat.
If a person has a sore throat the probability of not having flu is 0.4.
If a person does not have a sore throat the probability of having flu is 0.2.



Calculate the probability that a person chosen at random has flu.

[4]

Question 7



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Rooms in a hotel are numbered from 1 to 19.
Rooms are allocated at random as guests arrive.

- (a) What is the probability that the first guest to arrive is given a room which is a prime number?
(1 is not a prime number.)

[2]

- (b) The first guest to arrive is given a room which is a prime number.
What is the probability that the second guest to arrive is given a room which is a prime number?

[1]

Question 8

In a survey of 60 cars, the type of fuel that they use is recorded in the table below.

Each car only uses one type of fuel.

Petrol	Diesel	Liquid Hydrogen	Electricity
40	12	2	6

(a) Write down the mode. [1]

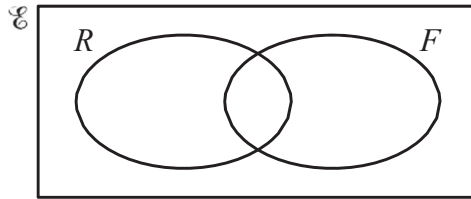
(b) Olav drew a pie chart to illustrate these figures.

Calculate the angle of the sector for Diesel. [2]

(c) Calculate the probability that a car chosen at random uses Electricity.

Write your answer as a fraction in its simplest form. [2]

Question 9



In the Venn diagram, $U = \{\text{students in a survey}\}$, $R = \{\text{students who like rugby}\}$ and $F = \{\text{students who like football}\}$.

$$n(U) = 20$$

$$n(R \cup F) = 17$$

$$n(R) = 13$$

$$n(F) = 11$$

(a) Find

(i) $n(R \cap F)$, [1]

(ii) $n(R' \cap F)$. [1]

(b) A student who likes rugby is chosen at random.

Find the probability that this student also likes football. [1]

Question 10

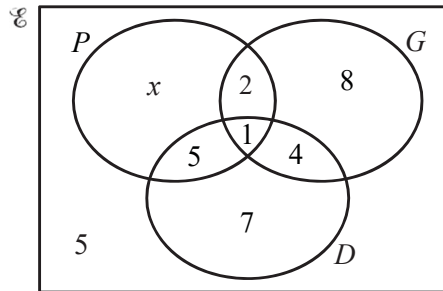
A teacher asks 36 students which musical instruments they play.

$P = \{\text{students who play the piano}\}$

$G = \{\text{students who play the guitar}\}$

$D = \{\text{students who play the drums}\}$

The Venn diagram shows the results.



(a) Find the value of x .

[1]

(b) A student is chosen at random.

Find the probability that this student

(i) plays the drums but not the guitar,

[1]

(ii) plays only 2 different instruments.

[1]

(c) A student is chosen at random from those who play the guitar.

Find the probability that this student plays no other instrument.

[1]

Question 11



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	Boys	Girls	Total
Asia	62	28	
Europe	35	45	
Africa		17	
Total			255

For a small international school, the holiday destinations of the 255 students are shown in the table.

(a) Complete the table. [3]

(b) What is the probability that a student chosen at random is a girl going on holiday to Europe?

[1]

Question 12



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Xsara throws a ball three times at a target.

Each time she throws the ball, the probability that she hits the target is 0.2.

Calculate the probability that she does **not** hit the target in any of the three throws.

[2]

Question 13

Two unbiased spinners are used in a game.
One spinner is numbered from 1 to 6 and the other is numbered from 1 to 3.
The scores on each spinner are **multiplied** together. The table below shows the possible outcomes.

		First Spinner			
		1	2		
Second Spinner	1	1	2	5	
	2	2	4	10	12
	3	3	6	12	15

(a) Find the probability that the outcome is even. [1]

(b) When the outcome is even, find the probability that it is also greater than 11. [2]

Question 16



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Paul and Sammy take part in a race.

The probability that Paul wins the race is $\frac{9}{35}$

The probability that Sammy wins the race is 26%.

Who is more likely to win the race?

Give a reason for your answer.

[2]

Question 17



A biased 4-sided dice is rolled. The possible scores are 1, 2, 3 or 4. The probability of rolling a 1, 3 or 4 is shown in the table.

Score	1	2	3	4
Probability	0.15		0.3	0.35

[2]

Complete the table.

Question 19

S P A C E S

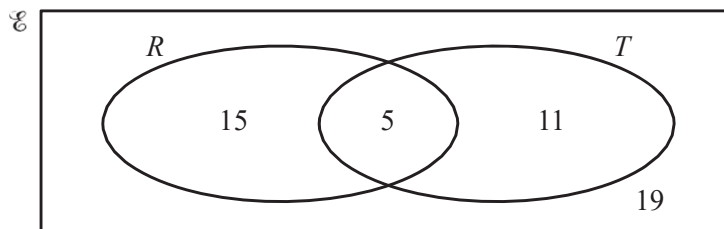
One of the 6 letters is taken at random.

(a) Write down the probability that the letter is S. [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? [1]

Question 20



The Venn diagram shows the number of red cars and the number of two-door cars in a car park. There is a total of 50 cars in the car park.

$R = \{\text{red cars}\}$ and $T = \{\text{two-door cars}\}$.

(a) A car is chosen at random.

Write down the probability that

(i) it is red and it is a two-door car, [1]

(ii) it is not red and it is a two-door car. [1]

(b) A two-door car is chosen at random.

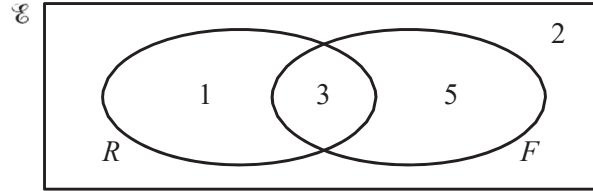
Write down the probability that it is not red. [1]

(c) Two cars are chosen at random.

Find the probability that they are both red. [2]

(d) On the Venn diagram, shade the region $R \cup T'$. [1]

Question 21



11 students are asked if they like rugby (R) and if they like football (F).
The Venn diagram shows the results.

(a) A student is chosen at random.

What is the probability that the student likes rugby **and** football?

[1]

(b) On the Venn diagram shade the region $R' \cap F'$.

[1]

Question 22

The Ocean View Hotel has 300 rooms numbered from 100 to 399.
A room is chosen at random.

Find the probability that the room number ends in zero.

[2]

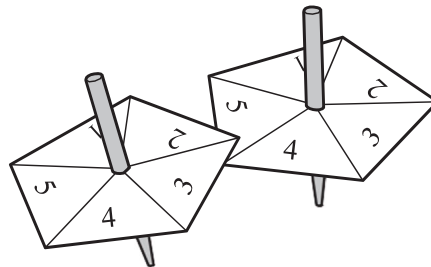
Question 23

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.

5	+	+	+	+	+
4	+	+	+	+	+
3	+	+	+	+	+
2	+	+	+	+	+
1	+	+	+	+	+
	1	2	3	4	5

Second spinner

First spinner



Find the probability that

(a) both spinners show the same number,

[2]

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

[2]

Question

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,

[2]

(b) they are both the same colour,

[3]

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

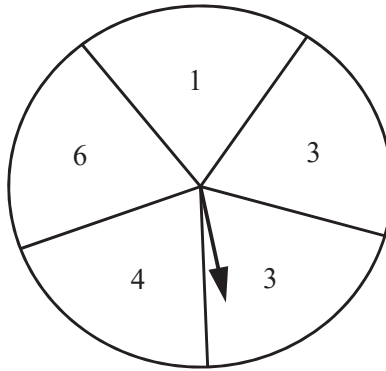
[3]

Question 25



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The diagram shows a fair spinner.



Anna spins it twice and adds the scores.

(a) Complete the table for the total scores.

		Score on first spin				
		1	3	3	4	6
Score on second spin	1	2	4	4	5	7
	3	4	6	6	7	9
	3	4	6	6	7	9
	4					
	6					

[1]

(b) Write down the most likely total score.

[1]

(c) Find the probability that Anna scores

[2]

(i) a total less than 6,

(ii) a total of 3.

[1]

Question 26



The probability that Stephanie wins her next tennis match is 0.85 .

Find the probability that Stephanie does not win her next tennis match.

[1]

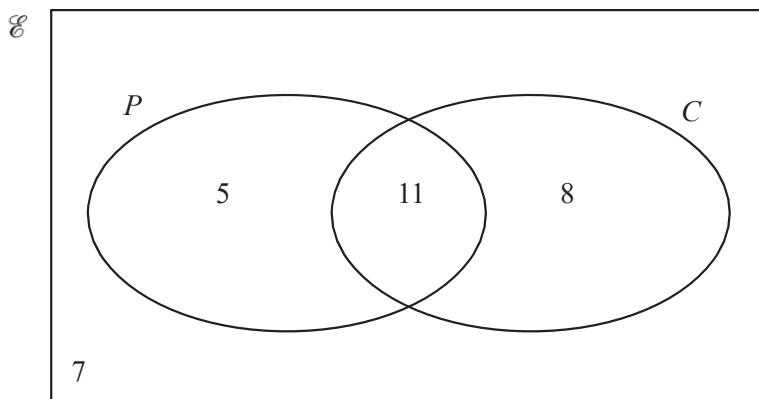
Question 27



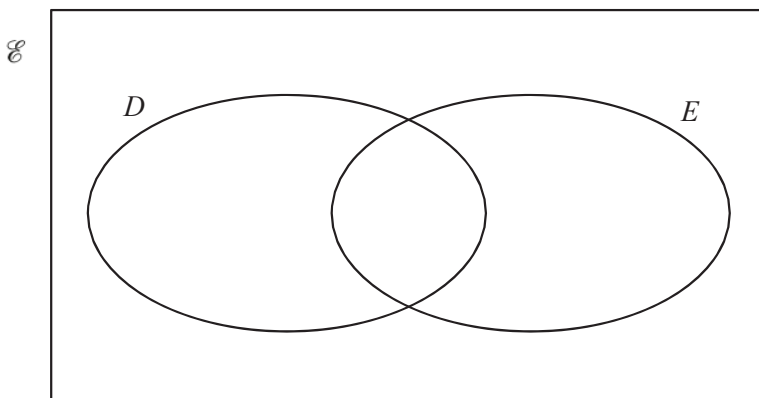
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- (a) $\mathcal{E} = \{\text{students in a class}\}$
 $P = \{\text{students who study physics}\}$
 $C = \{\text{students who study chemistry}\}$

The Venn diagram shows numbers of students.



- (i) Find the number of students who study physics or chemistry. [1]
- (ii) Find $n(P \cap C')$. [1]
- (iii) A student who does not study chemistry is chosen at random. [1]
Find the probability that this student does not study physics.
- (b) On the Venn diagram below, shade the region $D \cup E'$. [1]



Question 28



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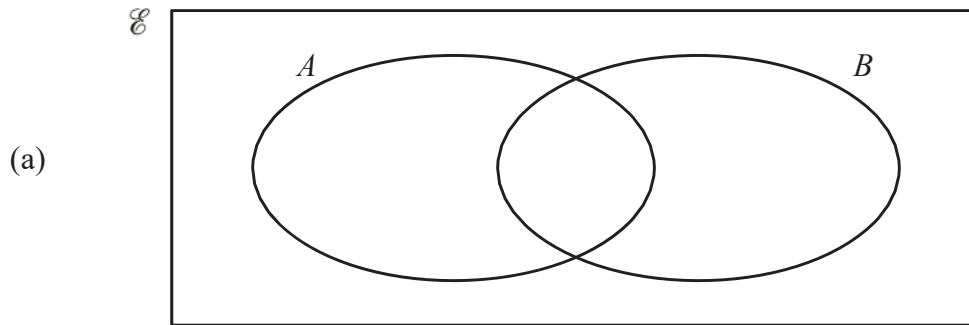
The probability that Pedro scores a goal in any match is $\frac{2}{5}$.

Calculate the probability that Pedro scores a goal in each of the next two matches.

[2]

Question 29

$$n(\mathcal{E}) = 10, n(A) = 7, n(B) = 6, n(A \cup B)' = 1.$$



(i) Complete the Venn diagram by writing the number of elements in each subset. [2]

(ii) An element \mathcal{E} is chosen at random.

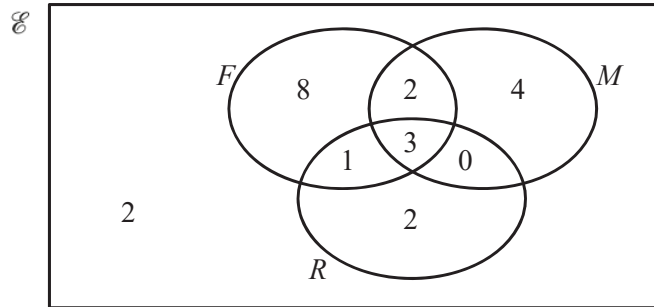
Find the probability that this element is an element $A' \cap B$. [1]

(b) On the Venn diagram below, shade the region $C' \cap D'$. [1]

Question 30



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The Venn diagram shows the number of people who like films (F), music (M) and reading (R).

(a) Find

[1]

(i) $n(M)$,

(ii) $n(R \cap M)$.

(b) A person is chosen at random from the people who like films.

[1]

Write down the probability that this person also likes music.

[1]

(c) On the Venn diagram, shade $M' \cap (F \cup R)$.

[1]

Question 31



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,

[2]

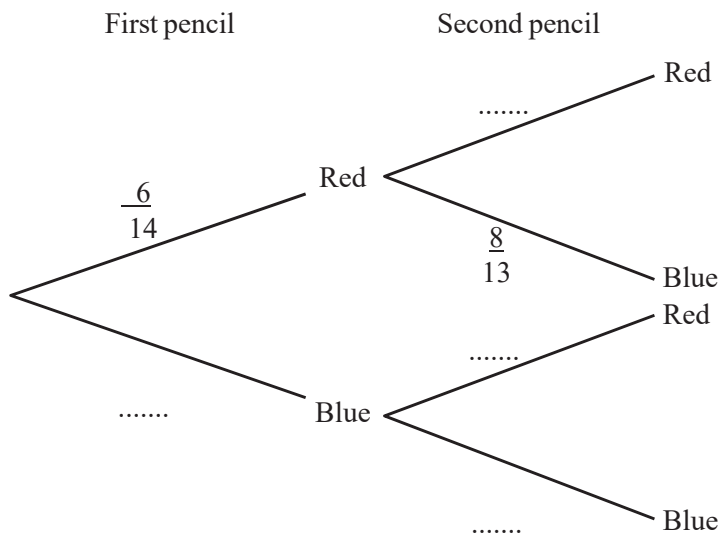
(b) have different coloured eyes.

[4]

Question 32

A box contains 6 red pencils and 8 blue pencils.
A pencil is chosen at random and not replaced.
A second pencil is then chosen at random.

(a) Complete the tree diagram.



[2]

(b) Calculate the probability that

(i) both pencils are red,

[2]

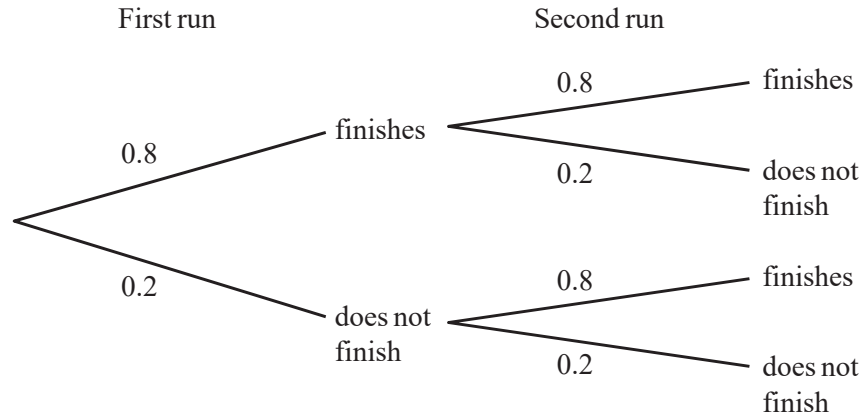
(ii) at least one of the pencils is red.

[3]

Question 33



Samira takes part in two charity runs.
The probability that she finishes each run is 0.8 .



Find the probability that Samira finishes at least one run.

[3]