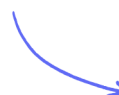


Probability Diagrams (Tree & Venn Diagrams)

Two-Way Tables / Probabilities from Venn Diagrams / Probability Tree Diagrams /
Combined Probabilities

Medium (5 questions)	/17
Hard (4 questions)	/23
Very Hard (4 questions)	/23
Total Marks	/63

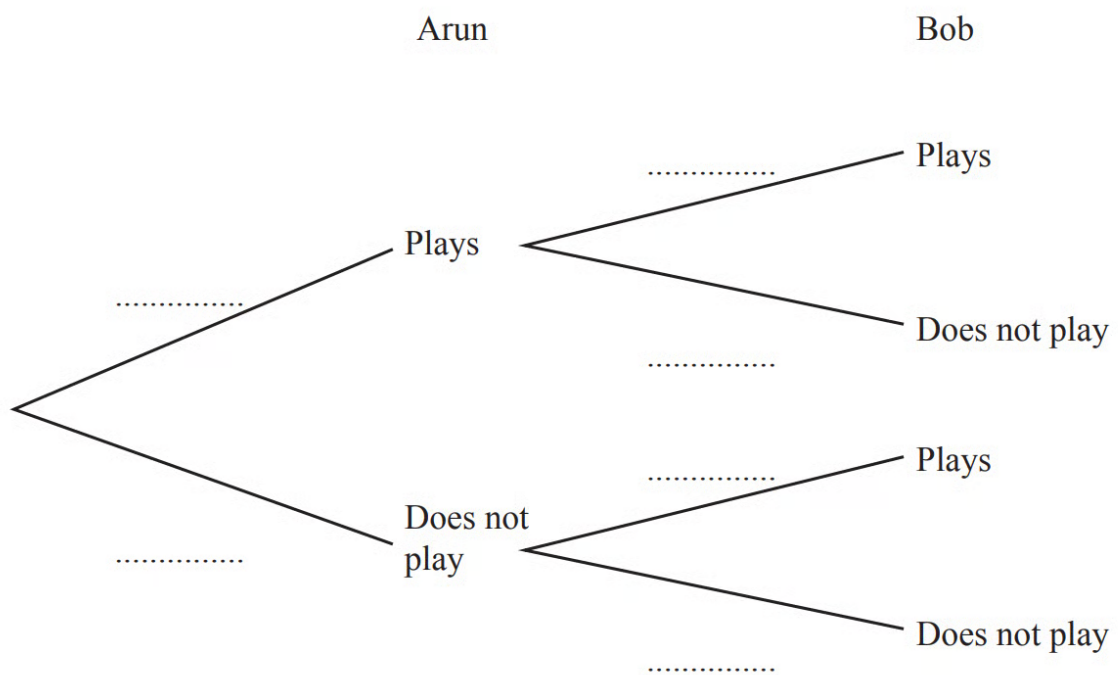
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Medium Questions

- 1 (a)** On any Saturday, the probability that Arun plays football is $\frac{3}{4}$. On any Saturday, the probability that Bob plays football is $\frac{2}{5}$.

Complete the tree diagram.



(2 marks)

- (b)** Calculate the probability that, one Saturday, Arun and Bob both play football.

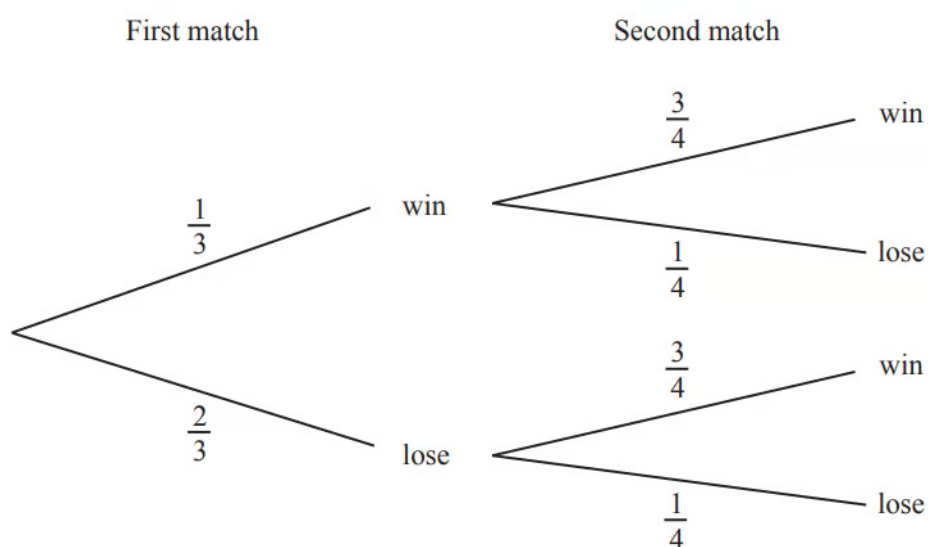
(2 marks)

- (c)** Calculate the probability that, one Saturday, either Arun plays football or Bob plays football, but not both.

(3 marks)

2 A soccer team plays two matches.

The tree diagram shows the probability of the team winning or losing the matches.



Find the probability that the soccer team wins at least one of the two matches.

(3 marks)

3 (a) $\mathcal{E} = \{\text{students in a school}\}$

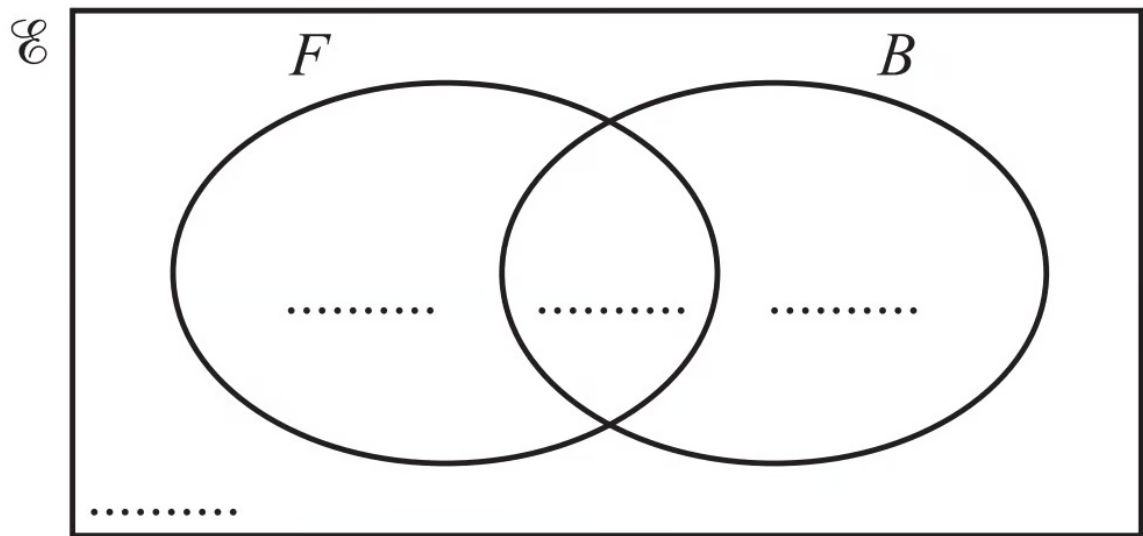
$F = \{\text{students who play football}\}$

$B = \{\text{students who play baseball}\}$

There are 240 students in the school.

- 120 students play football
- 40 students play baseball
- 90 students play football but not baseball.

Complete the Venn diagram to show this information.



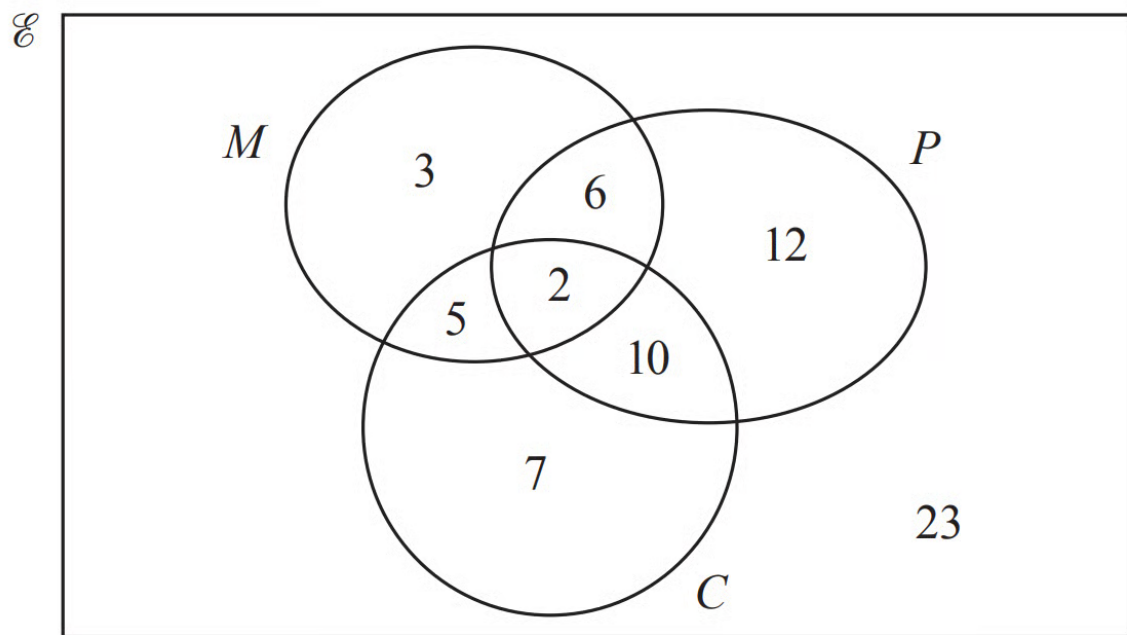
(2 marks)

- (b) A student in the school is chosen at random.
Find the probability that this student plays baseball but not football.

(1 mark)

4 The Venn diagram below shows information about the number of gardeners who grow

melons (M), potatoes (P) and carrots (C).

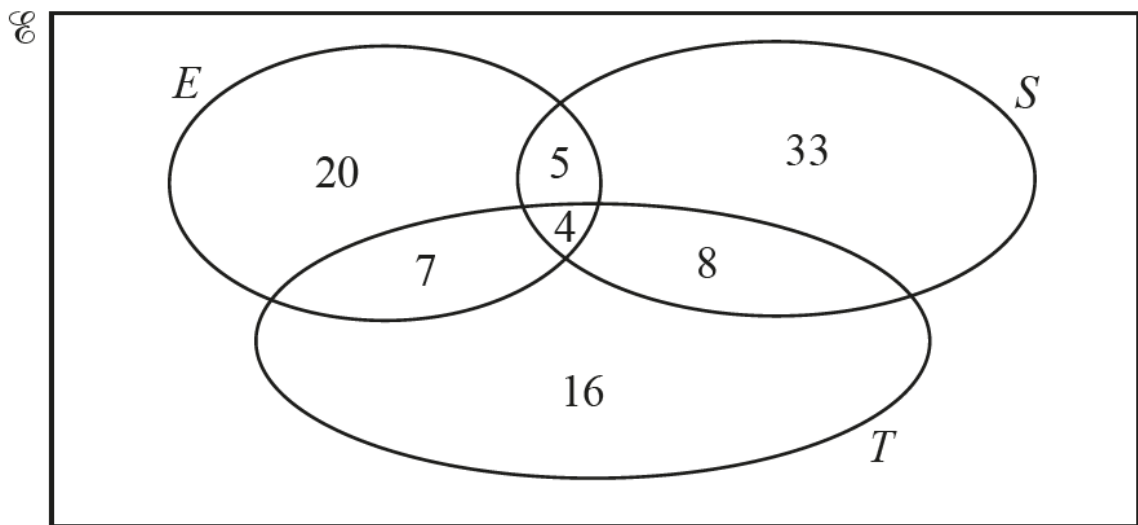


A gardener is chosen at random from the gardeners who grow melons.
Find the probability that this gardener does not grow carrots.

(2 marks)

- 5 At a fitness centre, the number of members using the exercise machines (E), the

swimming pool (S) and the tennis courts (T) is shown on the Venn diagram.



A member using the swimming pool is chosen at random. Find the probability that this member also uses the tennis courts and the exercise machines.

(2 marks)

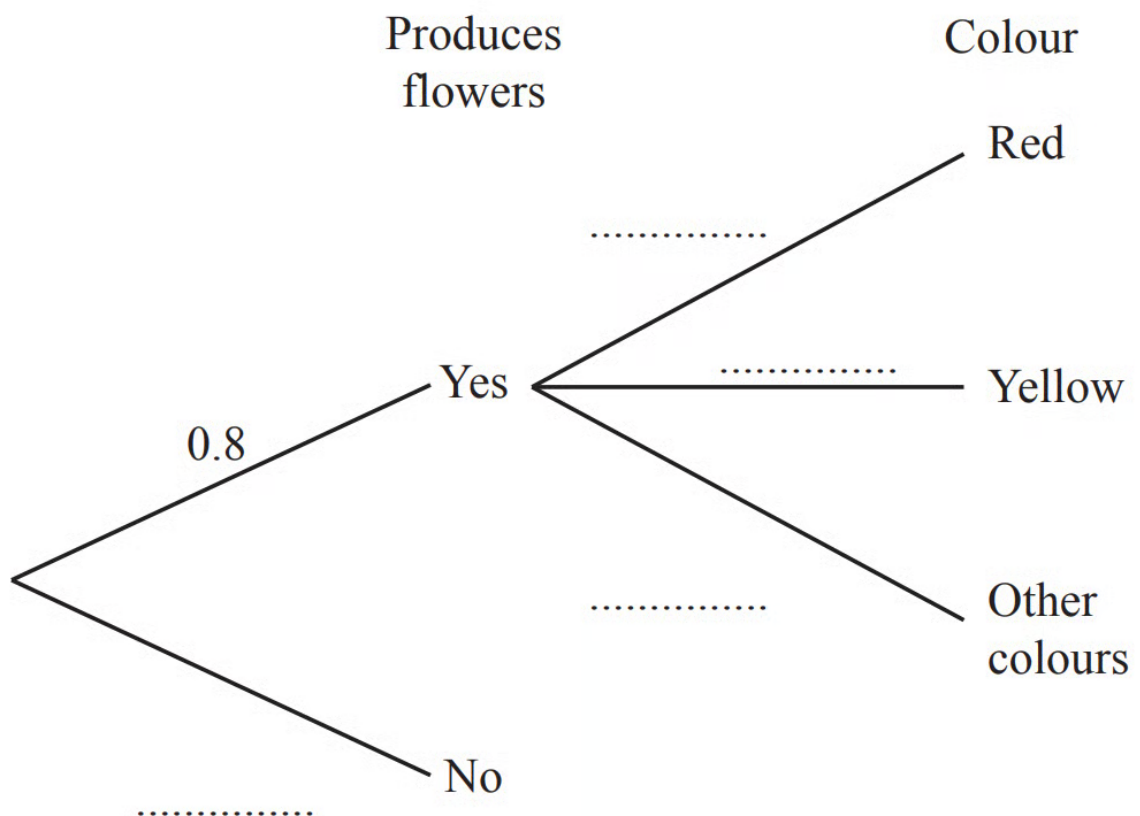
Hard Questions

1 (a) Tanya plants some seeds.

The probability that a seed will produce flowers is 0.8.

When a seed produces flowers, the probability that the flowers are red is 0.6 and the probability that the flowers are yellow is 0.3.

Complete the tree diagram.



(2 marks)

(b) Find the probability that a seed chosen at random produces red flowers.

(2 marks)

(c) Tanya chooses a seed at random.

Find the probability that this seed does not produce red flowers and does not produce yellow flowers.

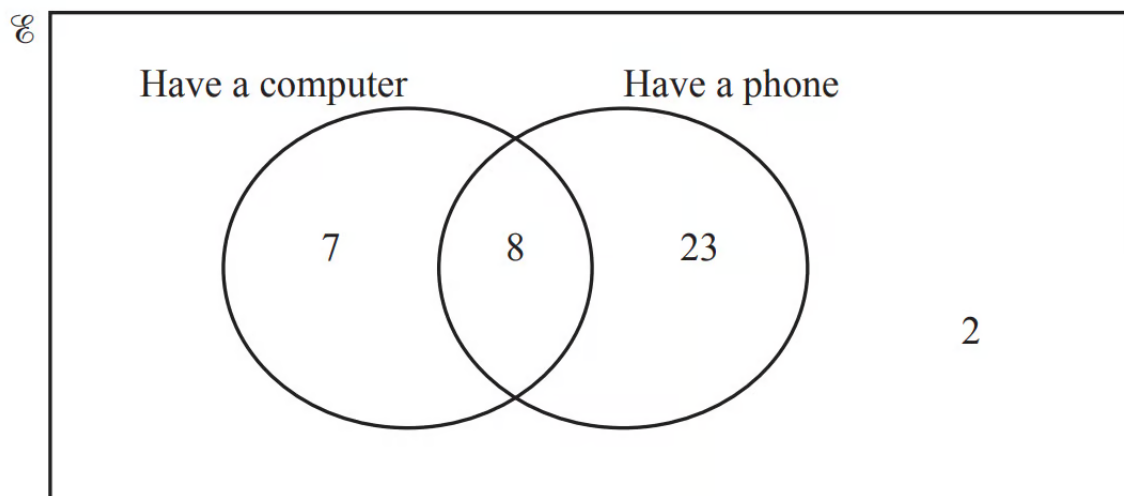
(3 marks)

(d) Two of the seeds are chosen at random.

Find the probability that one produces flowers and one does not produce flowers.

(3 marks)

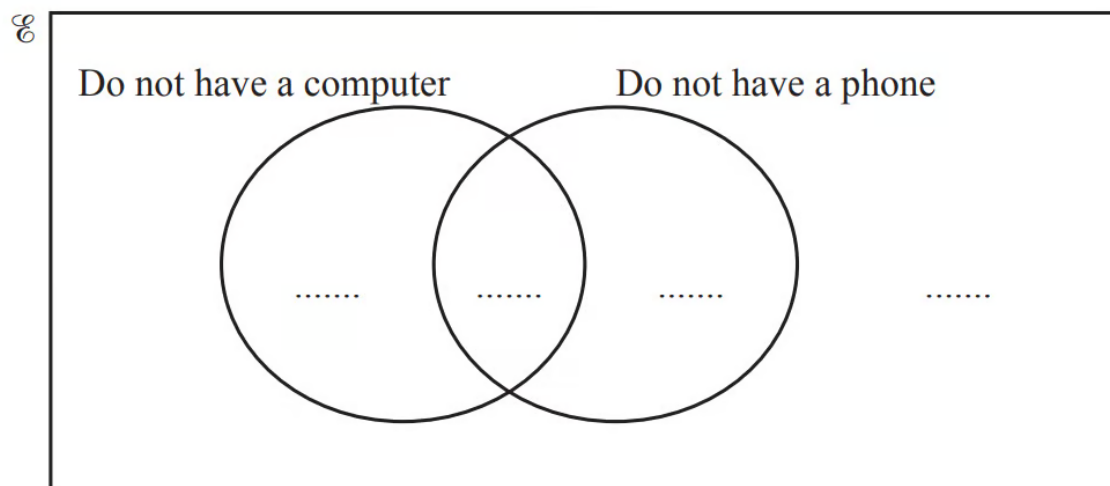
- 2 (a)** 40 children were asked if they have a computer or a phone or both.
The Venn diagram shows the results.



A child is chosen at random from the children who have a computer.
Write down the probability that this child also has a phone.

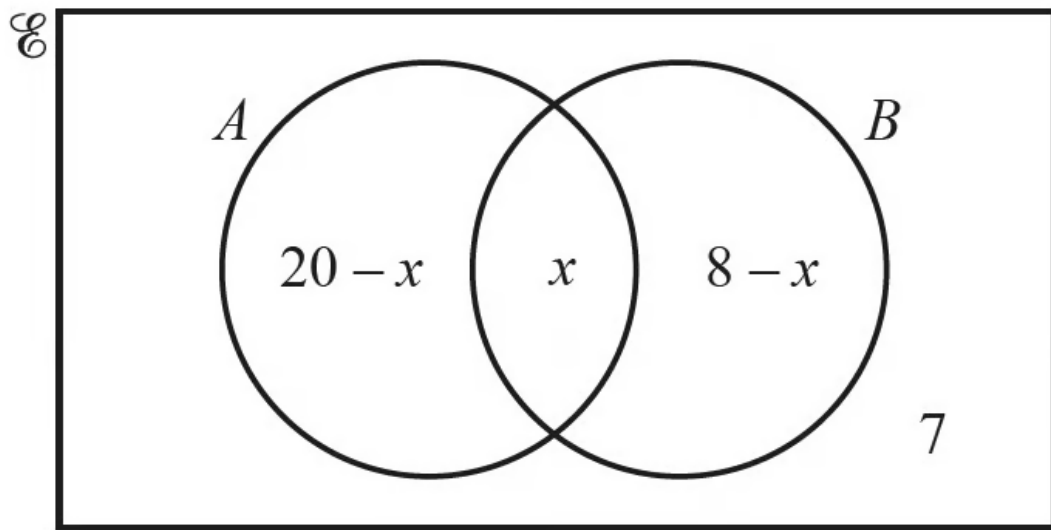
(1 mark)

- (b)** Complete the Venn diagram.



(2 marks)

3 (a) The Venn diagram shows information about the number of elements in sets A , B and $\mathcal{E}$.



$n(A \cup B) = 23$ Find the value of x .

$x = \dots\dots\dots$

(3 marks)

(b) An element is chosen at random from $\mathcal{E}$.
Find the probability that this element is in $(A \cup B)'$.

(2 marks)

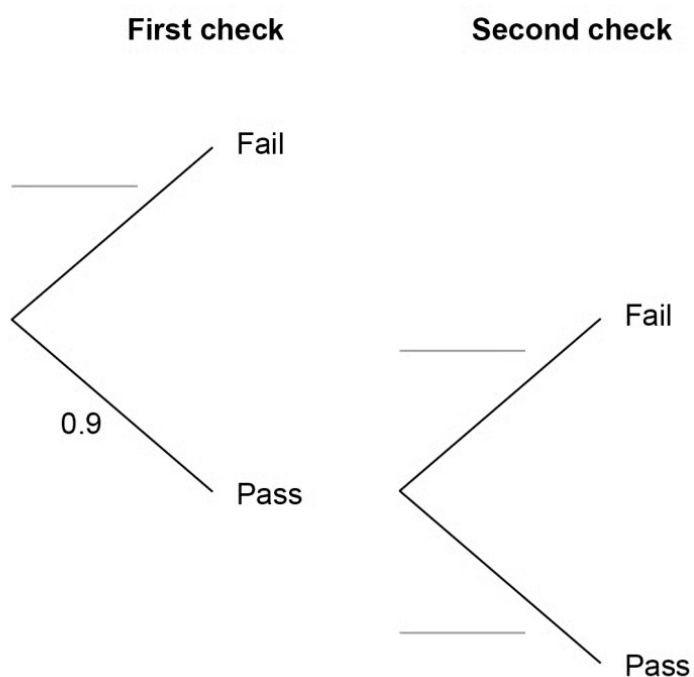
4 (a) Items made at a factory have to pass two checks.

90% pass the first check.

The items that fail are scrapped. 99% of the items that pass the first check pass the second check.

The items that fail are scrapped.

Complete the tree diagram.



(2 marks)

(b) An item is chosen at random before the checks.

Work out the probability that the item is scrapped.

(3 marks)

Very Hard Questions

1 (a) Harris is taking a driving test.

The probability that he passes the driving test at the first attempt is 0.6.

If he fails, the probability that he passes at any further attempt is 0.75.

Calculate the probability that Harris passes the driving test at the second attempt.

(2 marks)

(b) Calculate the probability that Harris takes no more than three attempts to pass the driving test.

(2 marks)

2 (a) The probability that Andrei cycles to school is r .

Write down, in terms of r , the probability that Andrei **does not** cycle to school.

(1 mark)

(b) The probability that Benoit **does not** cycle to school is $1.3 - r$. The probability that both Andrei and Benoit **do not** cycle to school is 0.4.

i) Complete the equation in terms of r .

$$(\dots\dots\dots) \times (\dots\dots\dots) = 0.4$$

[1]

ii) Show that this equation simplifies to $10r^2 - 23r + 9 = 0$.

[3]

iii) Solve by factorisation $10r^2 - 23r + 9 = 0$.

$$r = \dots\dots\dots \text{ or } r = \dots\dots\dots [3]$$

iv) Find the probability that Benoit **does not** cycle to school.

[1]

(8 marks)

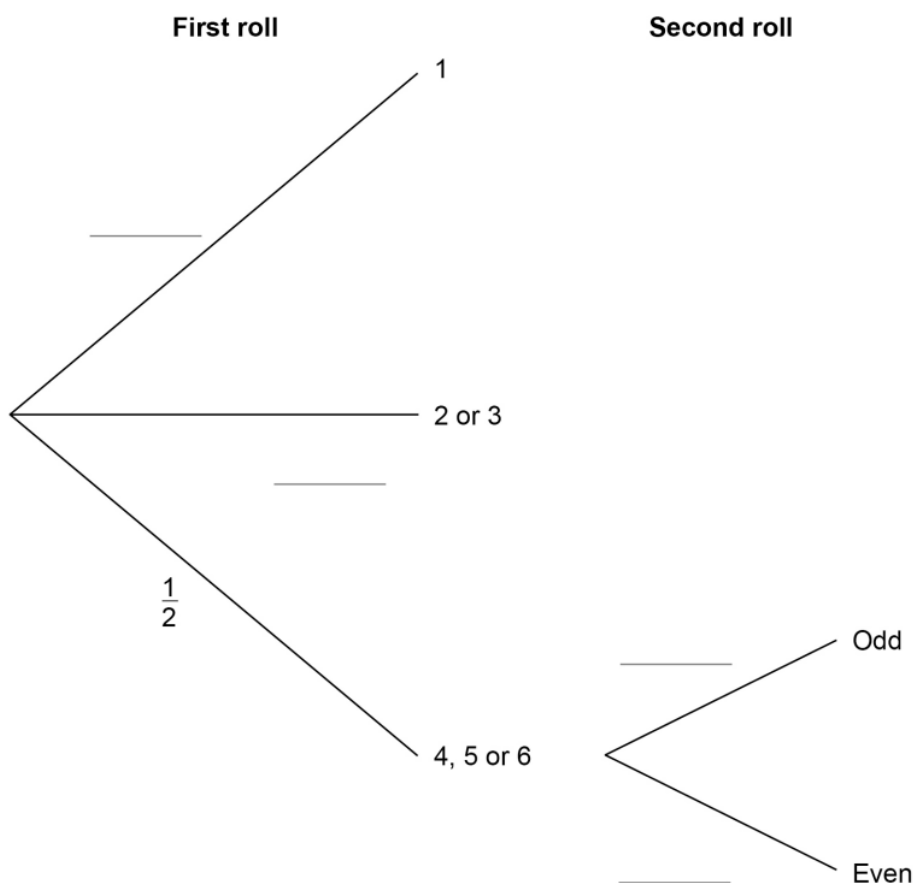
3 (a) Anna plays a game with an ordinary, fair dice.

If she rolls 1 she wins. If she rolls 2 or 3 she loses. If she rolls 4, 5 or 6 she rolls again.

When she has to roll again,

if she rolls an odd number she wins if she rolls an even number she loses.

Complete the tree diagram with the four missing probabilities.



(2 marks)

(b) Is Anna more likely to win or to lose?

You **must** work out the probability that she wins.

(4 marks)

4 (a) On Friday, Greg takes part in a long jump competition. He has to jump at least 7.5 metres to qualify for the final on Saturday.

- He has up to three jumps to qualify.
- If he jumps at least 7.5 metres he does **not** jump again on Friday.

Each time Greg jumps, the probability he jumps at least 7.5 metres is 0.8. Assume each jump is independent. Complete the tree diagram.

First jump	Second jump	Third jump
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(2 marks)

(b) Work out the probability that he does **not** need the third jump to qualify.

(2 marks)