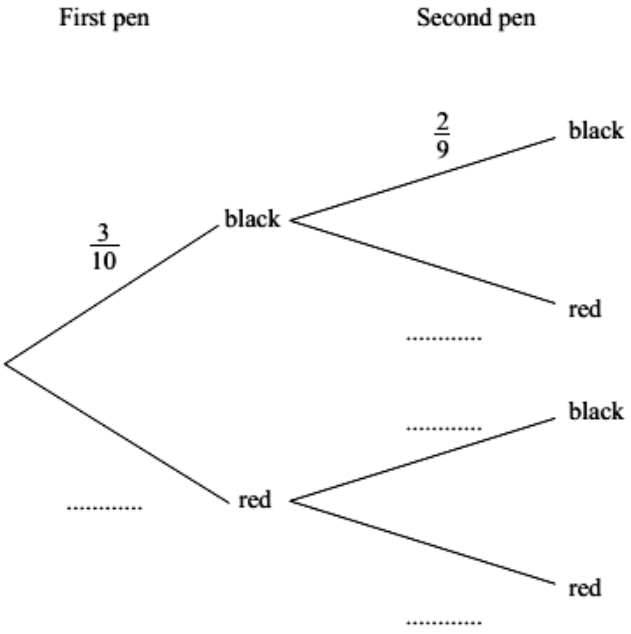
Topic: Probability Tree Diagram - P1

Marks: / 28 Grade: Time: 45 Minutes

Name: Class: Date:

1 Luis has 3 black pens and 7 red pens in a case.
He takes two pens from the case at random without replacement.

(a) Complete the tree diagram to show the possible outcomes and their probabilities.



[1]

(b) Find, as a fraction in its lowest terms, the probability that

(i) Luis takes two black pens,

Answer ..... [1]

(ii) Luis takes two different coloured pens.

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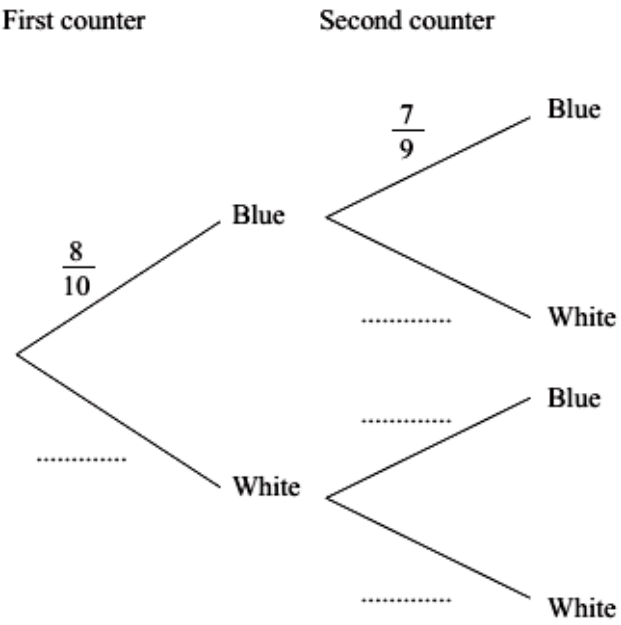
Answer ..... [2]

2

A bag contains 10 counters of which 8 are blue and 2 are white.
Two counters are taken from the bag at random without replacement.

(a) Complete the tree diagram to show the possible outcomes and their probabilities.



[1]

(b) Find, as a fraction, the probability that

(i) both counters are blue,

Answer ..... [1]

(ii) one counter is blue and the other is white.

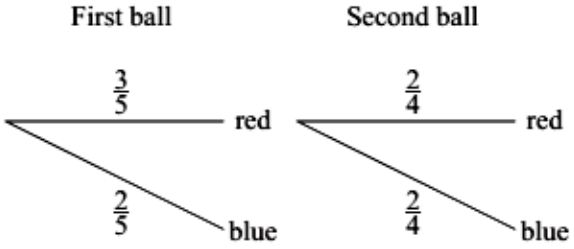
Answer ..... [2]

3

A bag contains 5 balls, of which 3 are red and 2 are blue.

One ball is taken, at random, from the bag and is not replaced.
If this ball is red, another ball is taken, at random, from the bag and is not replaced.
This process is repeated until a blue ball is taken from the bag.

Part of the tree diagram that represents these outcomes is drawn below.



(a) Complete the tree diagram. [2]

(b) Expressing each answer as a fraction, find the probability that

(i) the second ball taken is blue,

Answer ..... [1]

(ii) a blue ball is the second, or the third, ball taken.

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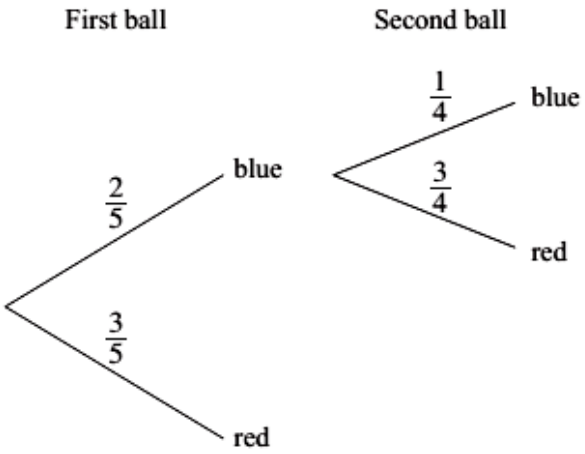
Answer ..... [2]

4

A bag contains 5 balls, 2 of which are blue and 3 are red.
One ball is taken, at random, from the bag.
If it is red it is put back into the bag.
If it is blue it is **not** put back into the bag.

A second ball is taken, at random, from the bag.
Part of the tree diagram that represents these outcomes is drawn below.



(a) Complete the tree diagram. [1]

(b) Expressing each answer as a fraction in its simplest form, find the probability that

(i) both balls taken are blue,

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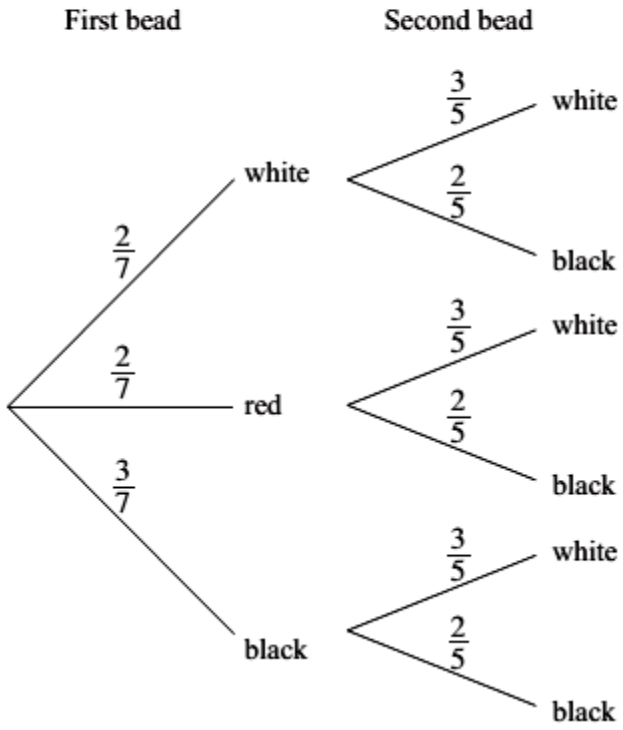
Answer ..... [1]

(ii) the second ball taken is blue.

Answer ..... [2]

5 Two bags contain beads.
The first bag contains 2 white, 2 red and 3 black beads.
The second bag contains 3 white and 2 black beads.
One bead is taken, at random, from each bag.
The tree diagram is shown below.



Find the probability that

(a) both beads are white,

Answer .....[1]

(b) both beads are red,

Answer .....[1]

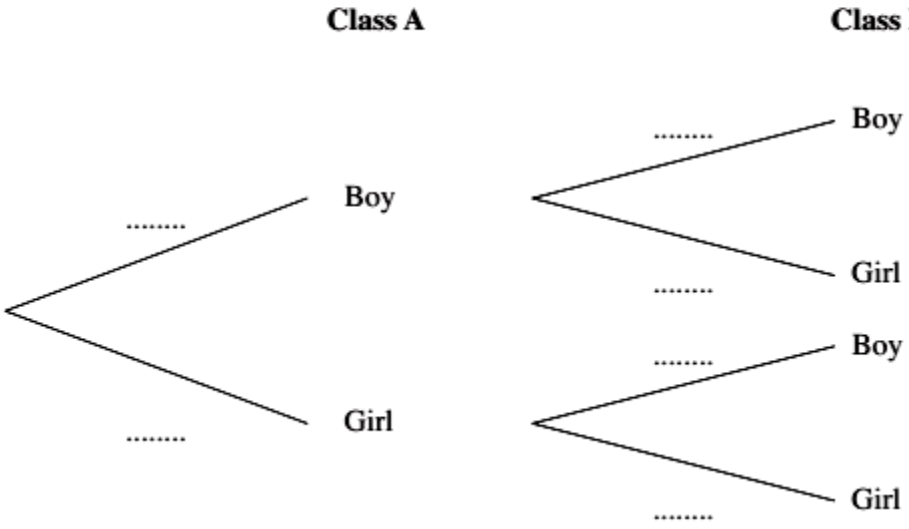
(c) **exactly** one bead is black.

Answer .....[2]

6

In class A there are 10 boys and 15 girls.
In class B there are 20 boys and 10 girls.
One student is picked from each class at random.

(a) Complete the tree diagram to show the probabilities of the possible outcomes.



[2]

(b) Find the probability that one student is a boy and one is a girl.
Express your answer as a fraction in its lowest terms.

Answer ..... [2]

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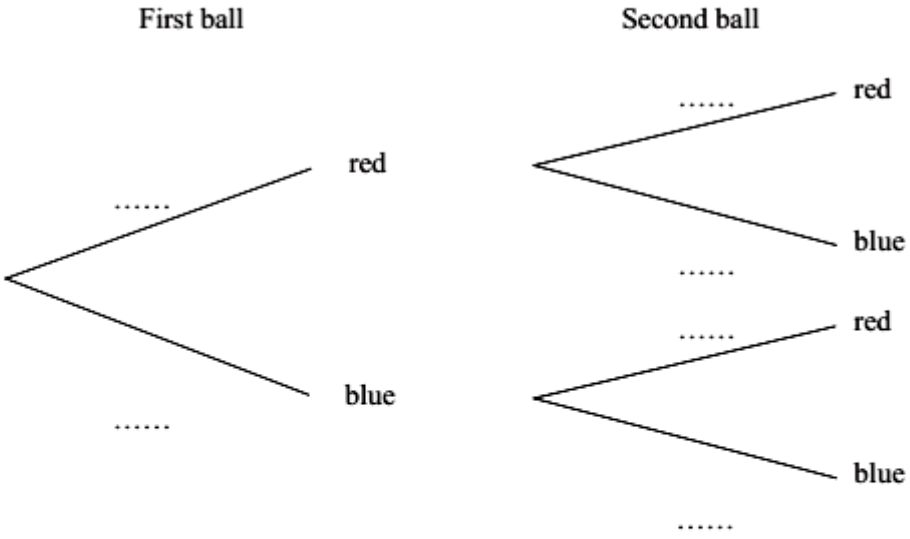
7

A bag contains 1 red and 3 blue balls.
Two balls are taken from the bag, at random, without replacement.
The tree diagram that represents all the outcomes is shown below.



(a) Write the appropriate probability on each branch. [2]

(b) Find the probability that the second ball taken is red.

Answer ..... [1]

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Topic: Probability Tree Diagram - P1 (Marking Scheme)

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Name: Class: Date:

1	(a)	$\frac{7}{10}, \frac{7}{9}, \frac{3}{9}, \frac{6}{9}$ correctly completed	1	
	(b) (i)	$\frac{1}{15}$	1	
	(ii)	$\frac{7}{15}$ FT	2	**B1** for $\frac{21}{90}$ oe FT Or **M1** for $\frac{3}{10}\times\frac{7}{9}+\frac{7}{10}\times\frac{3}{9}$
2	(a)	$\frac{2}{10}, \frac{2}{9}, \frac{8}{9}, \frac{1}{9}$ correctly positioned	1	
	(b) (i)	$\frac{56}{90}$ oe	1*	
	(ii)	$\frac{32}{90}$ oe	2ft*	**M1** for $\frac{8}{10}\times\frac{2}{9}+\frac{2}{10}\times\frac{8}{9}$ ft *their* tree diagram with fractions < 1
3	Correct third ball branches with $\frac{1}{3}$ and $\frac{2}{3}$ and correct fourth ball branch(es) with(0 and) 1		2	**B1** for either
	$\frac{3}{10}$ oe		1	
	$\frac{1}{2}$ oe		2	**B1** for $\frac{3}{5}\times\frac{2}{4}\times \textit{their}\left(\frac{2}{3}\right)$ seen
4	(a)	Correct completion of tree diagram	1	
	(b)	(i) $\frac{1}{10}$	1	
		(ii) $\frac{17}{50}$ or ft from *their* tree diagram	2√	**M1** for $\left\{\frac{2}{5}\times\frac{1}{4}\text{ or }\textit{their(bi)}\right\}+\frac{3}{5}\times\textit{their}\left(\frac{2}{5}\right)$
5	(a)	$\frac{6}{35}$	1	
	(b)	0	1	
	(c)	$\frac{17}{35}$	2	**C1** for $\frac{8}{35}$, or for $\frac{13}{35}$ or **B1** for $\frac{17}{\textit{their}(5\times 7)}$
6	(a)	Tree diagram correct	2	**B1** for both $\frac{10}{25}, \frac{15}{25}$ oe correct or both $\frac{20}{30}, \frac{10}{30}$ oe correct
	(b)	$\frac{8}{15}$ cao	2	**M1** for $\frac{10}{25}\times\frac{10}{30}+\frac{15}{25}\times\frac{20}{30}$ oe

7	(a)	$\left(\frac{1}{4} \text{ and } \frac{3}{4}\right)$; (0 and 1); $\left(\frac{1}{3} \text{ and } \frac{2}{3}\right)$ – all three pairs	2	**B1** for any one pair
	(b)	$\frac{1}{4}$ oe	1	