

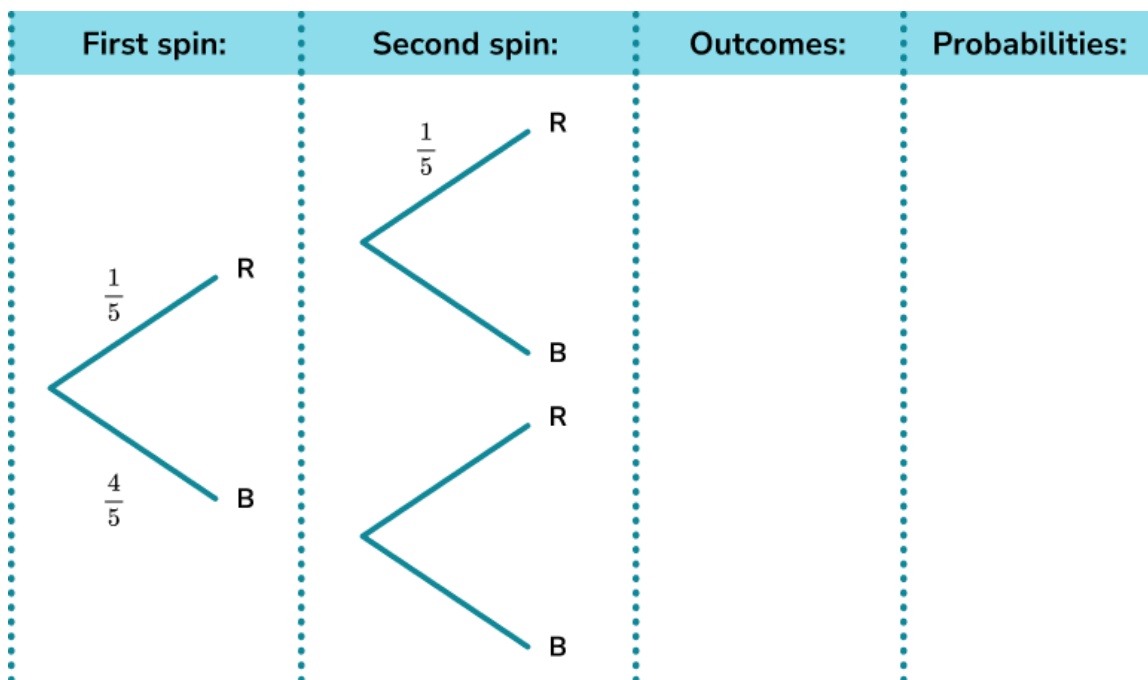
# Probability tree diagrams - Worksheet

## Skill

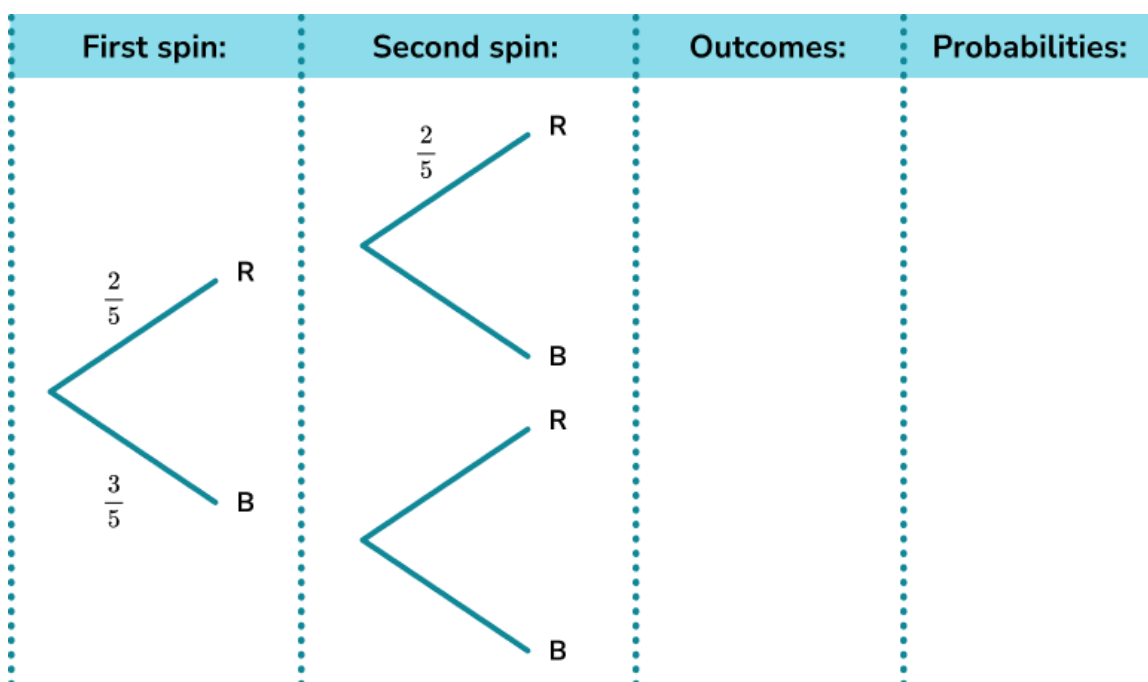
### Group A - Repeated event

Complete the probability tree diagrams, including the outcomes and their probabilities:

1) A spinner has 5 sections, 1 red and 4 blue. The spinner is spun twice.

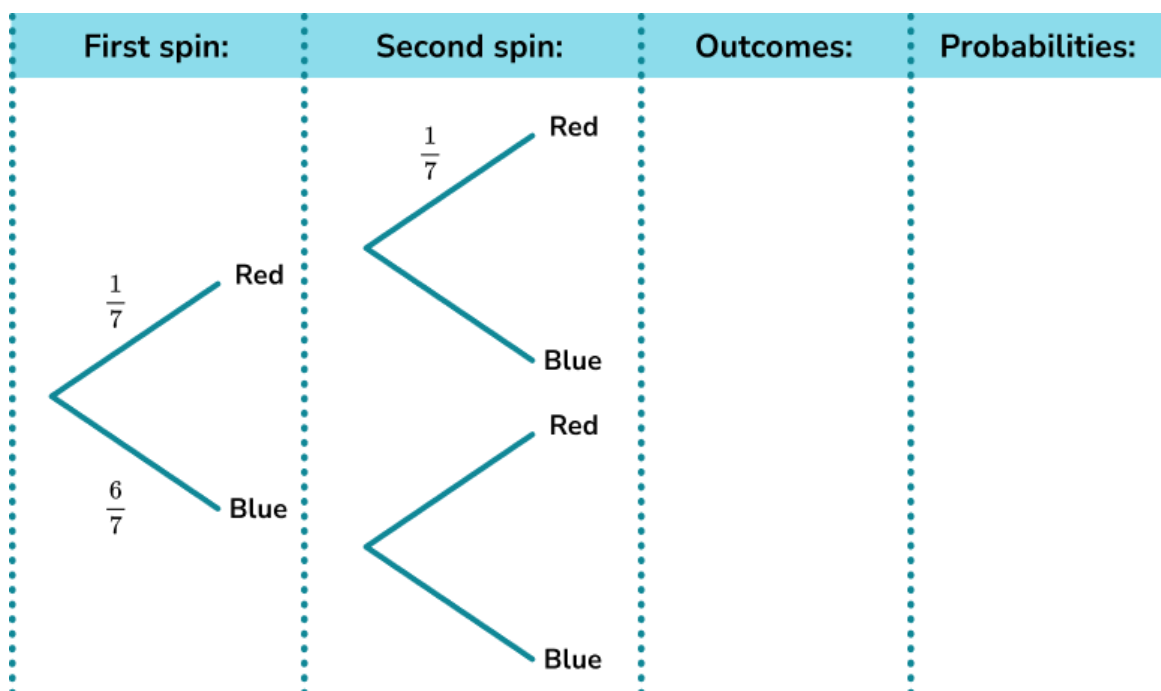


2) A spinner has 5 sections, 2 red and 3 blue. The spinner is spun twice.

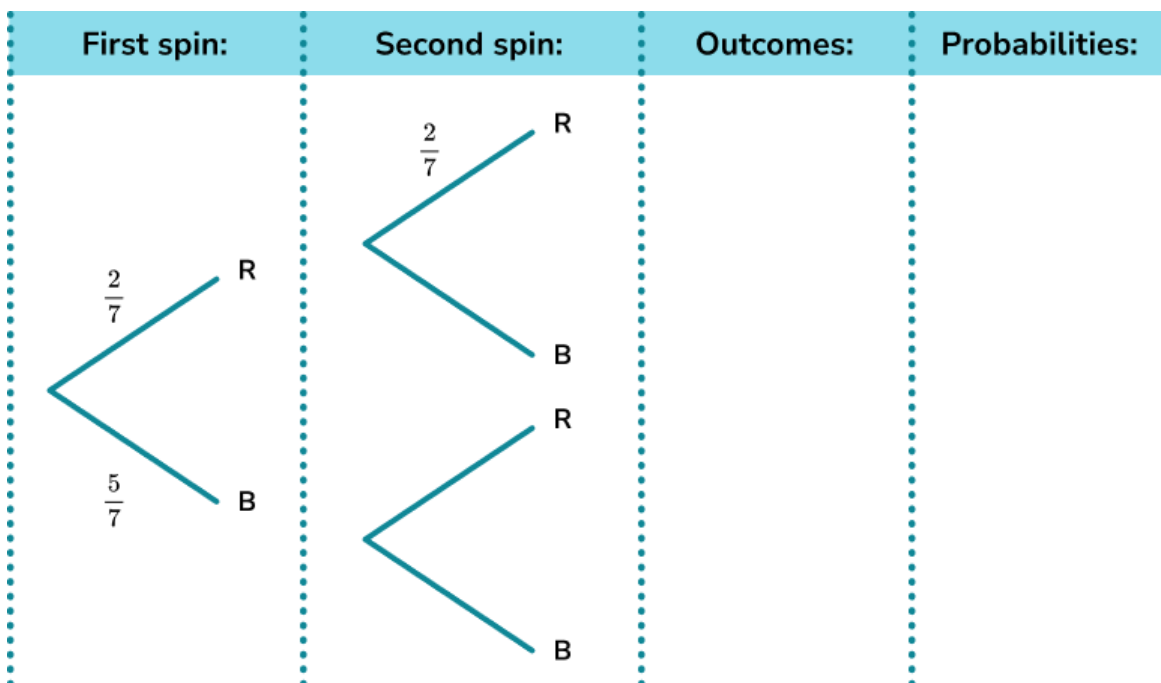


## Probability tree diagrams - Worksheet

3) A spinner has 7 sections, 1 red and 6 blue. The spinner is spun twice.



4) A spinner has 7 sections, 2 red and 5 blue. The spinner is spun twice.

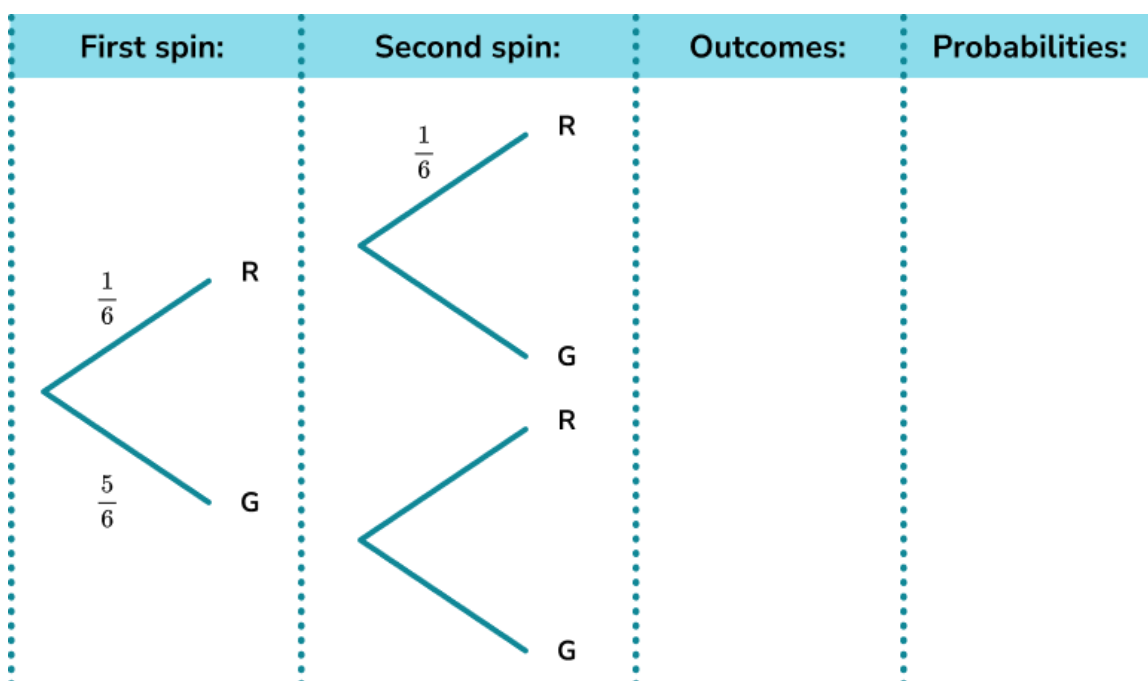


## Probability tree diagrams - Worksheet

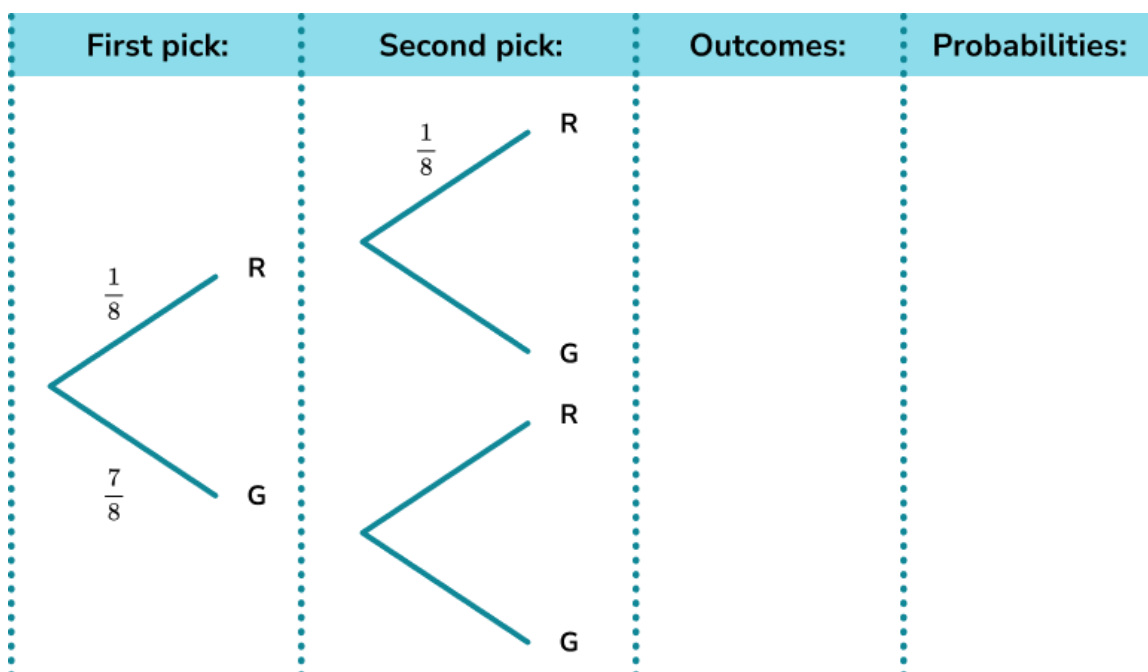
### Group B - With replacement

Complete the probability tree diagrams, including the outcomes and their probabilities:

1) A bag has 6 balls, 1 red and 5 green. A ball is picked and replaced. A second ball is picked.

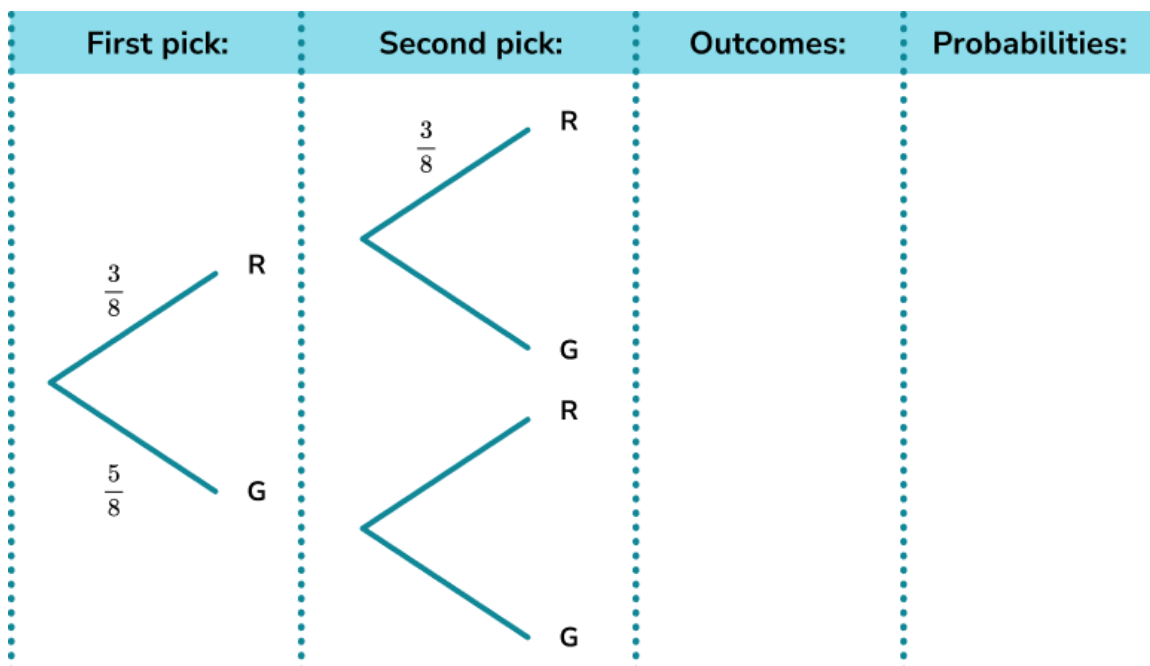


2) A bag has 8 balls, 1 red and 7 green. A ball is picked and replaced. A second ball is picked.

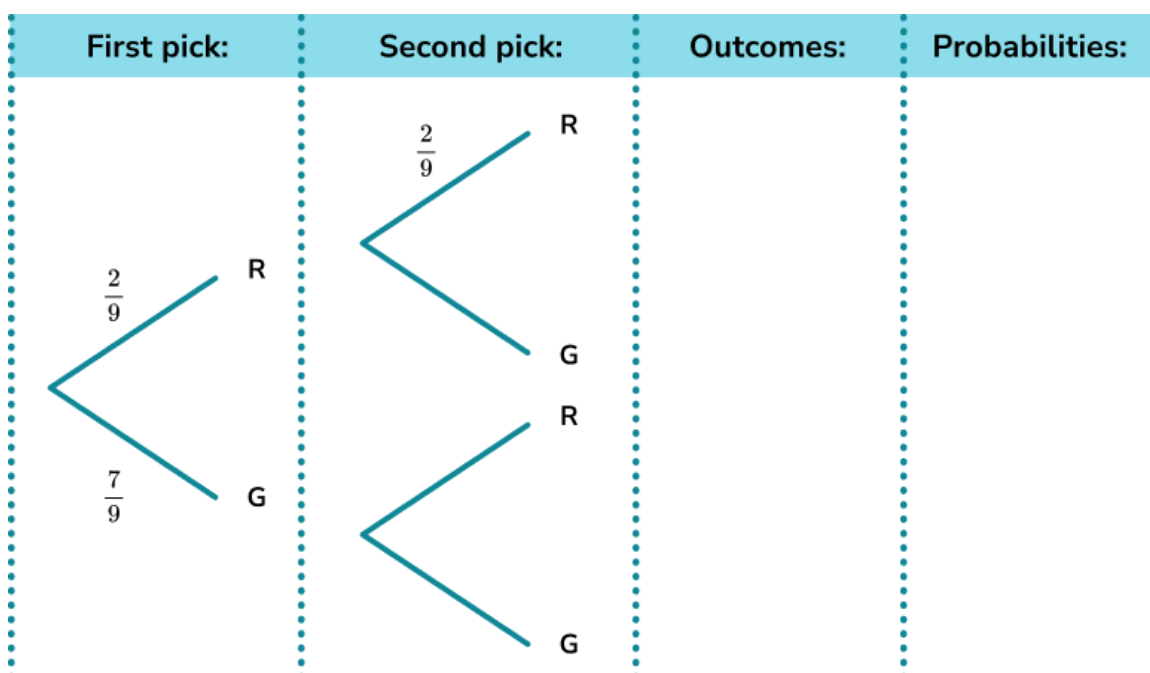


## Probability tree diagrams - Worksheet

3) A bag has 8 balls, 3 red and 5 green. A ball is picked and replaced. A second ball is picked.



4) A bag has 9 balls, 2 red and 7 green. A ball is picked and replaced. A second ball is picked.

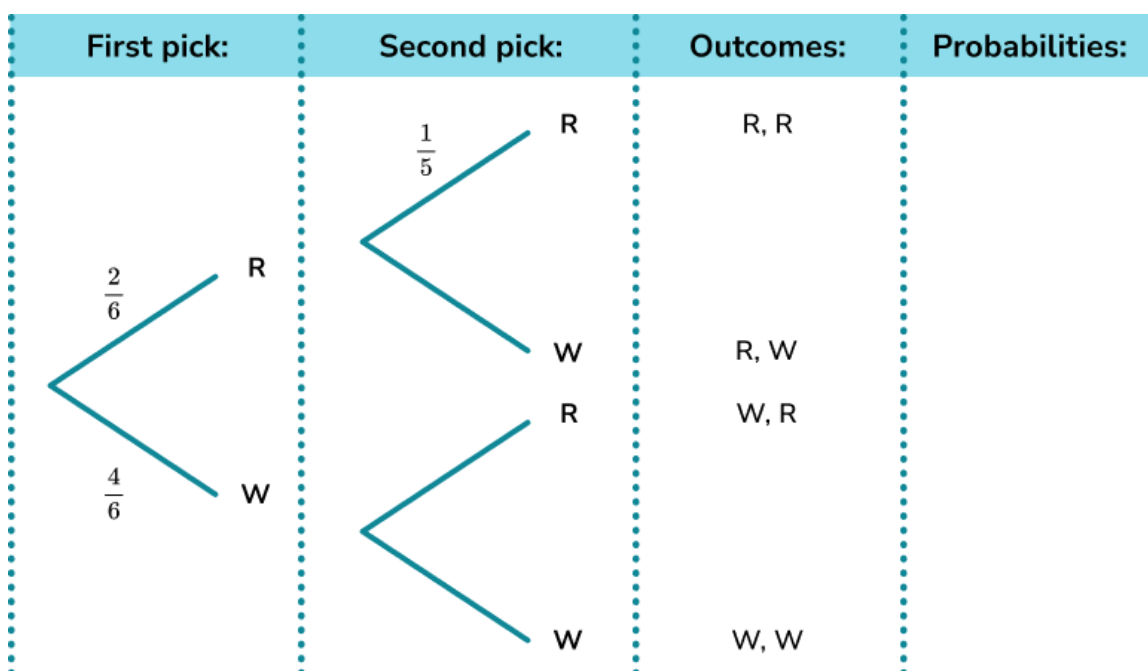


## Probability tree diagrams - Worksheet

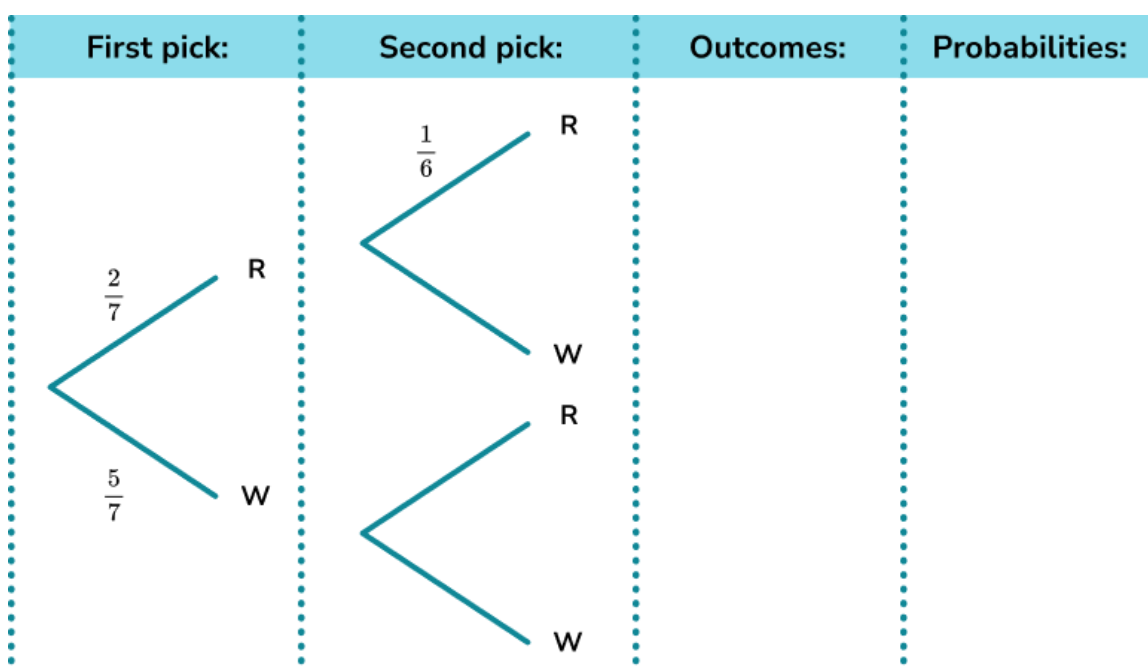
### Group C - Without replacement

Complete the probability tree diagrams, including the outcomes and their probabilities:  
(There is no need to simplify the fractions).

1) A bag has 6 balls, 2 red and 4 white. A ball is picked and **not** replaced. A second ball is picked.

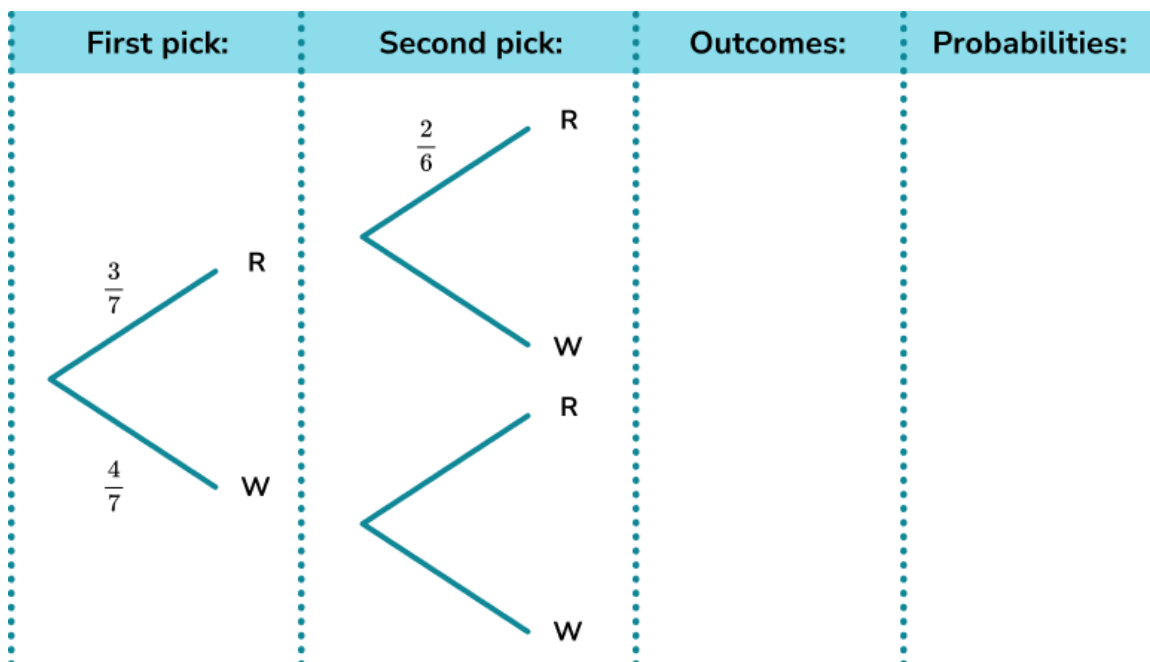


2) A bag has 7 balls, 2 red and 5 white. A ball is picked and **not** replaced. A second ball is picked.

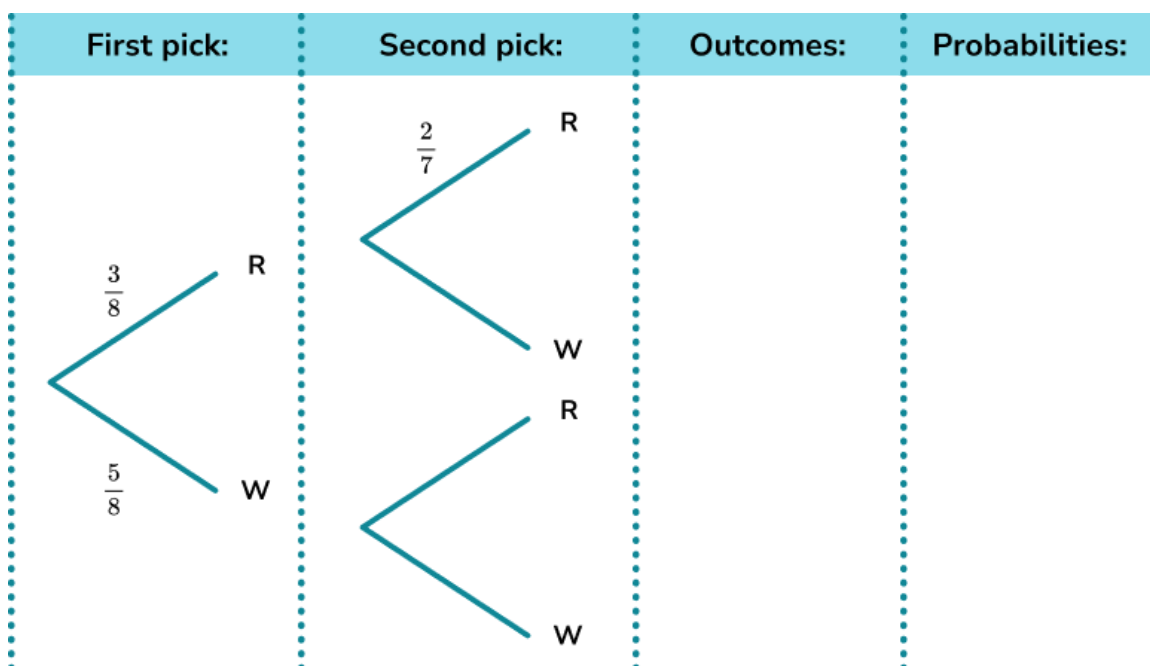


## Probability tree diagrams - Worksheet

3) A bag has 7 balls, 3 red and 4 white. A ball is picked and **not** replaced. A second ball is picked.



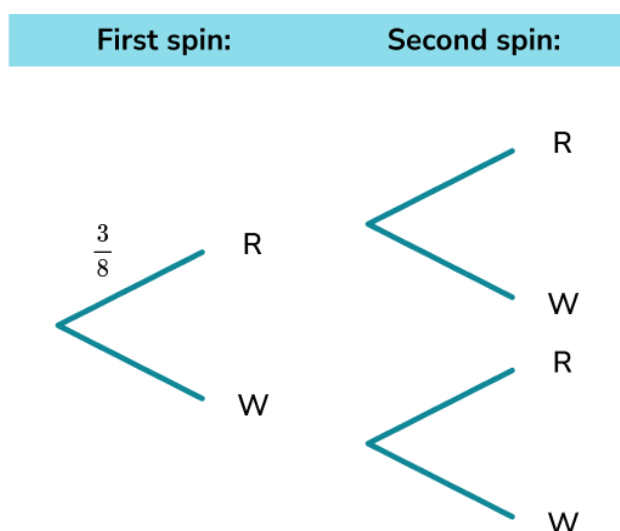
4) A bag has 8 balls, 3 red and 5 white. A ball is picked and **not** replaced. A second ball is picked.



# Probability tree diagrams - Worksheet

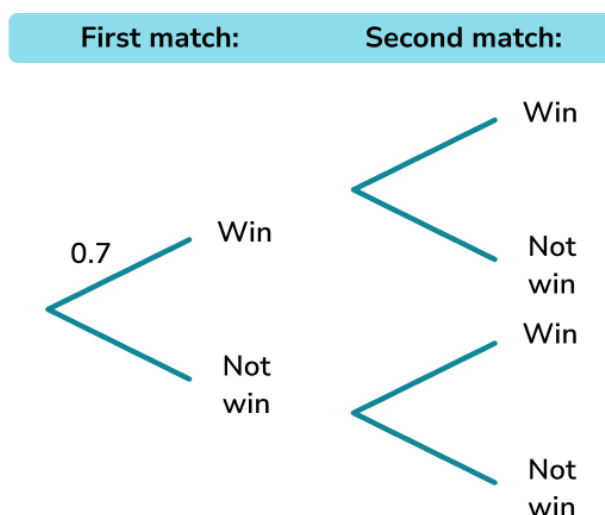
## Applied

- 1) (a) A spinner has 8 sections. 3 sections are red and the remaining sections are white. The spinner is spun twice. Fill in the missing probabilities on the tree diagram.



- (b) Work out the probability that the spinner lands on red twice.

- 2) (a) Maria plays tennis. The probability that she wins a match is 0.7. Maria plays 2 matches. Fill in the missing probabilities on the tree diagram.

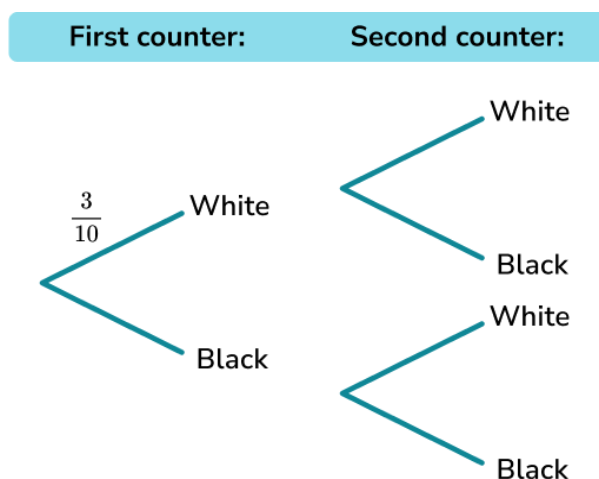


- (b) Work out the probability that Maria wins at least one match.

## Probability tree diagrams - Worksheet

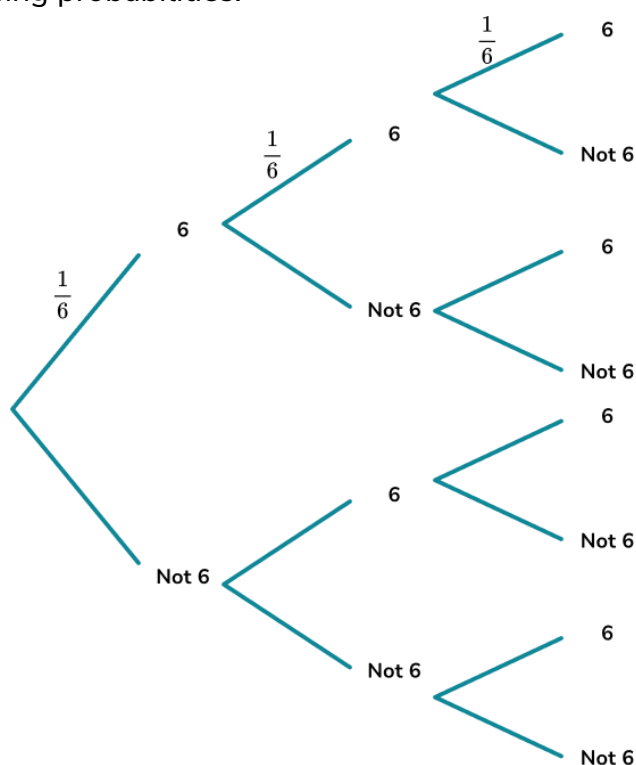
- 3) (a) 10 counters are in a bag. There are 3 white counters and the remaining counters are black. A counter is picked out at random. It is **not** replaced. A second counter is picked out at random.

Fill in the missing probabilities on the tree diagram.



- (b) Work out the probability that one of each colour counter is picked.

- 4) (a) Three unbiased dice are rolled.  
Fill in the missing probabilities.



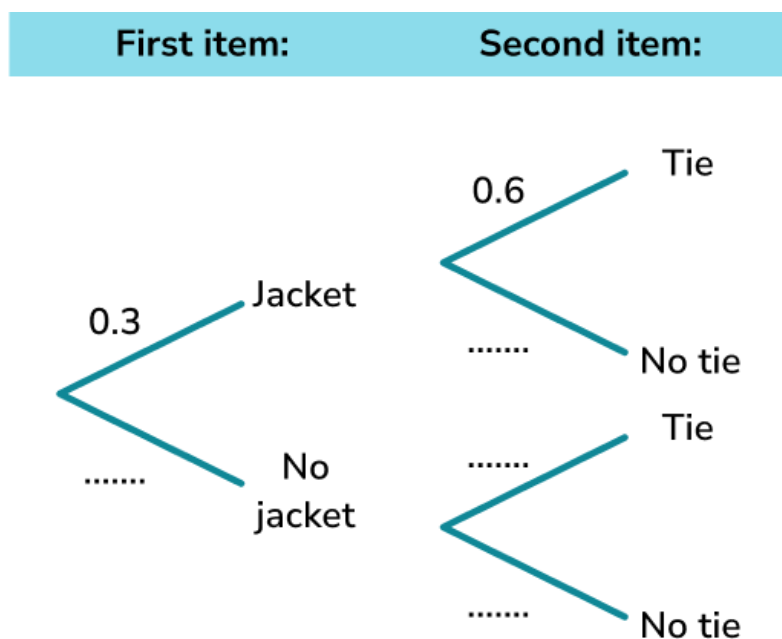
- (b) Work out the probability that only one '6' is rolled.



## Probability tree diagrams - Exam Questions

- 1) (a) Mr Jamal gets ready in the morning. The probability he wears a jacket is 0.3. The probability that he wears a tie is 0.6.

Complete the tree diagram.



(2)

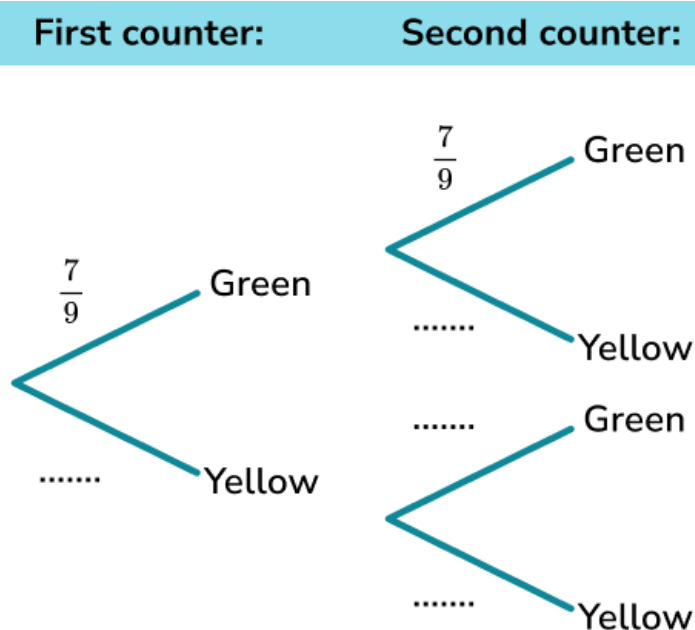
- (b) Work out the probability that Mr Jamal wears a jacket and a tie.

.....  
(2)  
(4 marks)

## Probability tree diagrams - Exam Questions

- 2) (a) A bag contains only green and yellow counters. Sophie picks a counter at random and then replaces it. Sophie then picks a second counter.

Complete the tree diagram.



(2)

- (b) Work out the probability that Sophie picks 2 green counters.

.....  
(2)

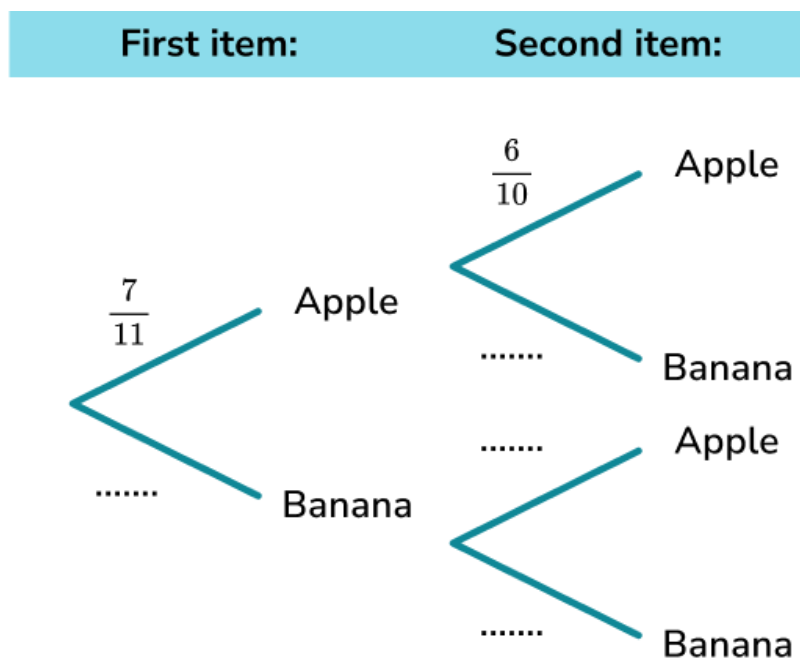
- (c) Work out the probability that Sophie picks at least one green counter.

.....  
(2)  
(6 marks)

## Probability tree diagrams - Exam Questions

- 3) (a) There are 7 apples and 4 bananas in a fruit bowl. A piece of fruit is selected at random. It is eaten. A second piece of fruit is selected at random and is also eaten.

Complete the tree diagram.

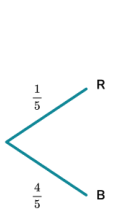
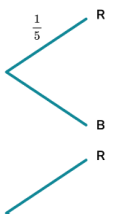
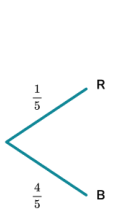
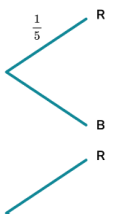
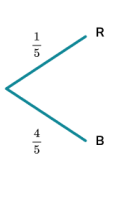
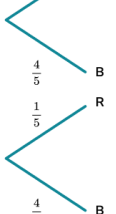
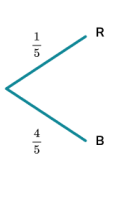
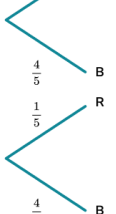
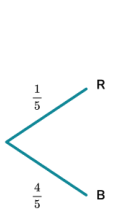
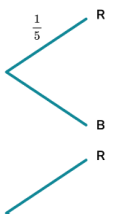
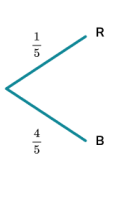
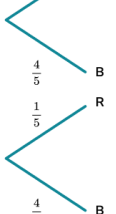
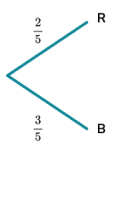
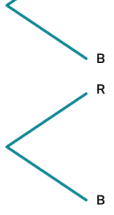
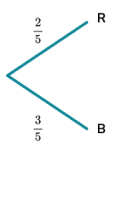
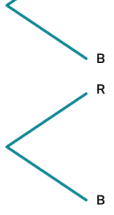
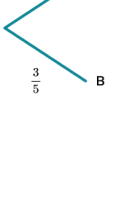
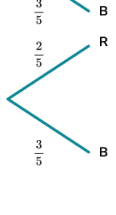
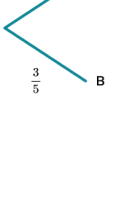
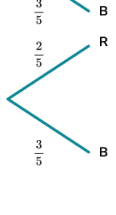
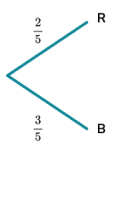
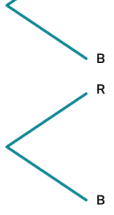
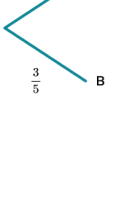
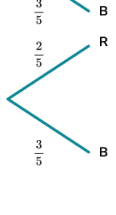
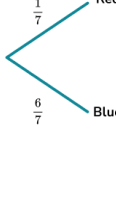

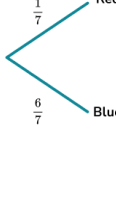

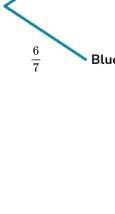
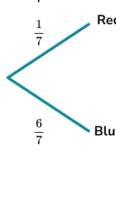
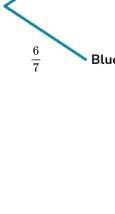
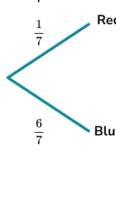
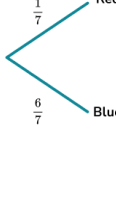

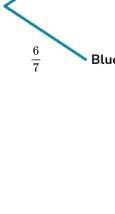
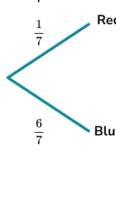


(2)

- (b) Work out the probability that one of each type of fruit is eaten.

.....  
(3)  
(5 marks)

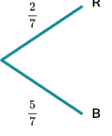
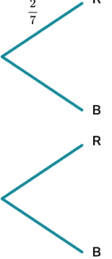
# Probability tree diagrams - Answers

	Question	Answer																
	Skill Questions																	
Group A	<p>Complete the probability tree diagrams, including the outcomes and their probabilities:</p> <p><b>1)</b> A spinner has 5 sections, 1 red and 4 blue. The spinner is spun twice.</p> <table><thead><tr><th>First spin:</th><th>Second spin:</th><th>Outcomes:</th><th>Probabilities:</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td></tr></tbody></table>	First spin:	Second spin:	Outcomes:	Probabilities:					<p><b>1)</b></p> <table><thead><tr><th>First spin:</th><th>Second spin:</th><th>Outcomes:</th><th>Probabilities:</th></tr></thead><tbody><tr><td></td><td></td><td>R, R  R, B B, R  B, B</td><td><math>\frac{1}{5} \times \frac{1}{5} = \frac{1}{25}</math>  <math>\frac{1}{5} \times \frac{4}{5} = \frac{4}{25}</math> <math>\frac{4}{5} \times \frac{1}{5} = \frac{4}{25}</math>  <math>\frac{4}{5} \times \frac{4}{5} = \frac{16}{25}</math></td></tr></tbody></table>	First spin:	Second spin:	Outcomes:	Probabilities:			R, R  R, B B, R  B, B	$\frac{1}{5} \times \frac{1}{5} = \frac{1}{25}$  $\frac{1}{5} \times \frac{4}{5} = \frac{4}{25}$ $\frac{4}{5} \times \frac{1}{5} = \frac{4}{25}$  $\frac{4}{5} \times \frac{4}{5} = \frac{16}{25}$
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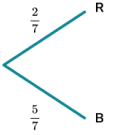
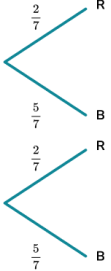
# Probability tree diagrams - Answers

Group A  
contd

**4)** A spinner has 7 sections, 2 red and 5 blue. The spinner is spun twice.

First spin:	Second spin:	Outcomes:	Probabilities:
			

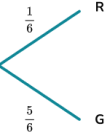

**4)**

First spin:	Second spin:	Outcomes:	Probabilities:
		R, R  R, B B, R  B, B	$\frac{2}{7} \times \frac{2}{7} = \frac{4}{49}$  $\frac{2}{7} \times \frac{5}{7} = \frac{10}{49}$ $\frac{5}{7} \times \frac{2}{7} = \frac{10}{49}$  $\frac{5}{7} \times \frac{5}{7} = \frac{25}{49}$

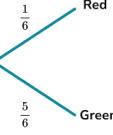
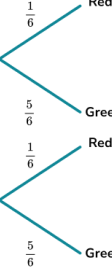
Group B

Complete the probability tree diagrams, including the outcomes and their probabilities:

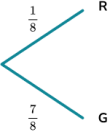

**1)** A bag has 6 balls, 1 red and 5 green. A ball is picked and replaced. A second ball is picked

First spin:	Second spin:	Outcomes:	Probabilities:
			

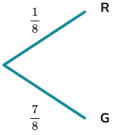

**1)**

First spin:	Second spin:	Outcomes:	Probabilities:
		R, R  R, G G, R  G, G	$\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$  $\frac{1}{6} \times \frac{5}{6} = \frac{5}{36}$ $\frac{5}{6} \times \frac{1}{6} = \frac{5}{36}$  $\frac{5}{6} \times \frac{5}{6} = \frac{25}{36}$

**2)** A bag has 8 balls, 1 red and 7 green. A ball is picked and replaced. A second ball is picked

First pick:	Second pick:	Outcomes:	Probabilities:
			

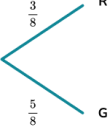

**2)**

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R  R, G G, R  G, G	$\frac{1}{8} \times \frac{1}{8} = \frac{1}{64}$  $\frac{1}{8} \times \frac{7}{8} = \frac{7}{64}$ $\frac{7}{8} \times \frac{1}{8} = \frac{7}{64}$  $\frac{7}{8} \times \frac{7}{8} = \frac{49}{64}$

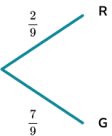

# Probability tree diagrams - Answers

Group B  
contd

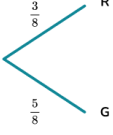

**3)** A bag has 8 balls, 3 red and 5 green. A ball is picked and replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
			

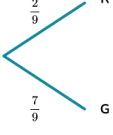

**4)** A bag has 9 balls, 2 red and 7 green. A ball is picked and replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
			

**3)**

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R  R, G G, R  G, G	$\frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$  $\frac{3}{8} \times \frac{5}{8} = \frac{15}{64}$ $\frac{5}{8} \times \frac{3}{8} = \frac{15}{64}$  $\frac{5}{8} \times \frac{5}{8} = \frac{25}{64}$

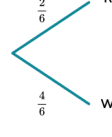

**4)**

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R  R, G G, R  G, G	$\frac{2}{9} \times \frac{2}{9} = \frac{4}{81}$  $\frac{2}{9} \times \frac{7}{9} = \frac{14}{81}$ $\frac{7}{9} \times \frac{2}{9} = \frac{14}{81}$  $\frac{7}{9} \times \frac{7}{9} = \frac{49}{81}$

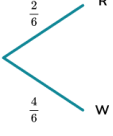
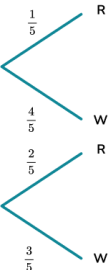
Group C

Complete the probability tree diagrams, including the outcomes and their probabilities: (There is no need to simplify the fractions).

**1)** A bag has 6 balls, 2 red and 4 white. A ball is picked and **not** replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R  R, W W, R  W, W	

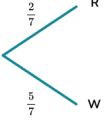

**1)**

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R  R, W W, R  W, W	$\frac{2}{6} \times \frac{1}{5} = \frac{2}{30}$  $\frac{2}{6} \times \frac{4}{5} = \frac{8}{30}$ $\frac{4}{6} \times \frac{2}{5} = \frac{8}{30}$  $\frac{4}{6} \times \frac{3}{5} = \frac{12}{30}$

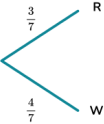

# Probability tree diagrams - Answers

Group C  
contd

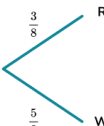

2) A bag has 7 balls, 2 red and 5 white. A ball is picked and **not** replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
			

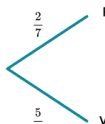
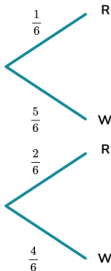
3) A bag has 7 balls, 3 red and 4 white. A ball is picked and **not** replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
			

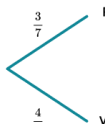

4) A bag has 8 balls, 3 red and 5 white. A ball is picked and **not** replaced. A second ball is picked.

First pick:	Second pick:	Outcomes:	Probabilities:
			

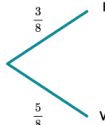
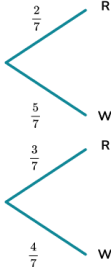
2)

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R R, W W, R W, W	$\frac{2}{7} \times \frac{1}{6} = \frac{2}{42}$ $\frac{2}{7} \times \frac{5}{6} = \frac{10}{42}$ $\frac{5}{7} \times \frac{2}{6} = \frac{10}{42}$ $\frac{5}{7} \times \frac{4}{6} = \frac{20}{42}$

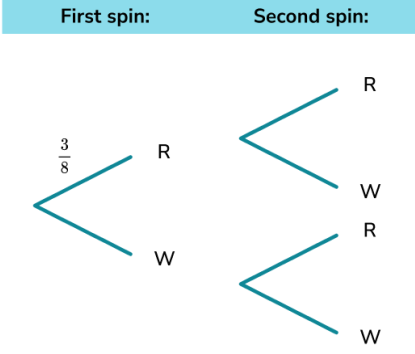
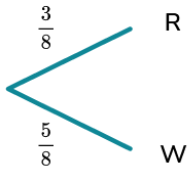
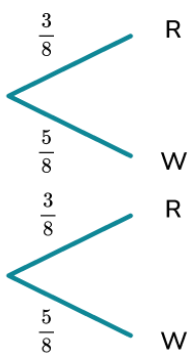
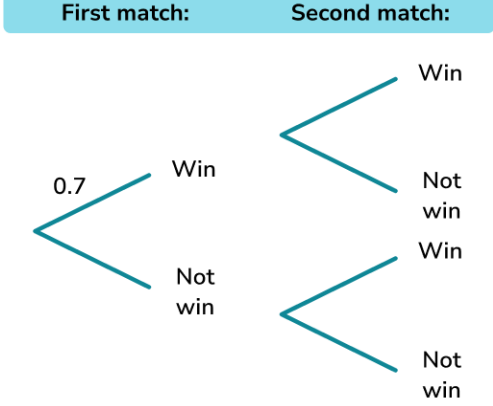
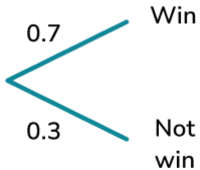
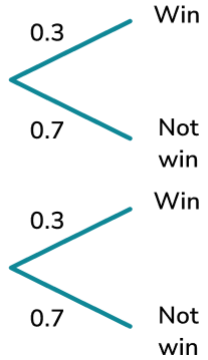
3)

First pick:	Second pick:	Outcomes:	Probabilities:
		R, R R, W W, R W, W	$\frac{3}{7} \times \frac{2}{6} = \frac{6}{42}$ $\frac{3}{7} \times \frac{4}{6} = \frac{12}{42}$ $\frac{4}{7} \times \frac{3}{6} = \frac{12}{42}$ $\frac{4}{7} \times \frac{3}{6} = \frac{12}{42}$

4)

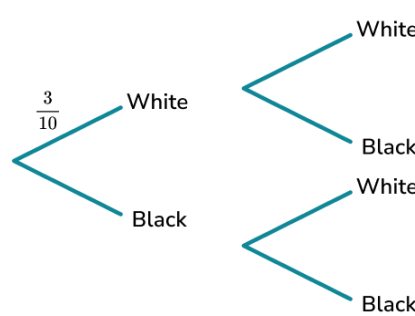
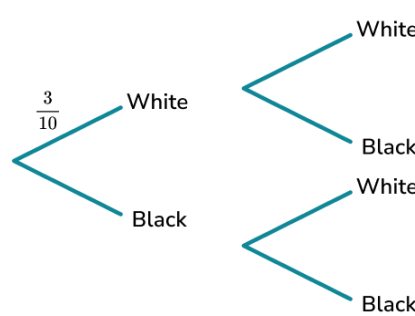
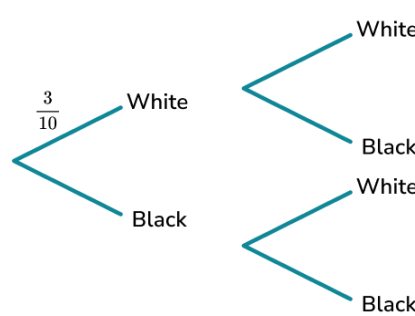
First pick:	Second pick:	Outcomes:	Probabilities:
		R, R R, W W, R W, W	$\frac{3}{8} \times \frac{2}{7} = \frac{6}{56}$ $\frac{3}{8} \times \frac{5}{7} = \frac{15}{56}$ $\frac{5}{8} \times \frac{3}{7} = \frac{15}{56}$ $\frac{5}{8} \times \frac{4}{7} = \frac{20}{56}$

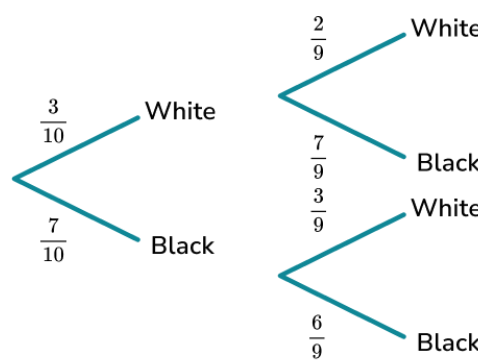
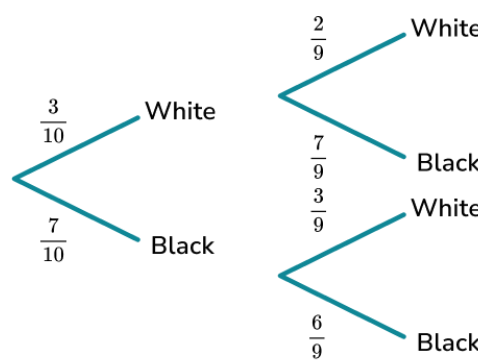
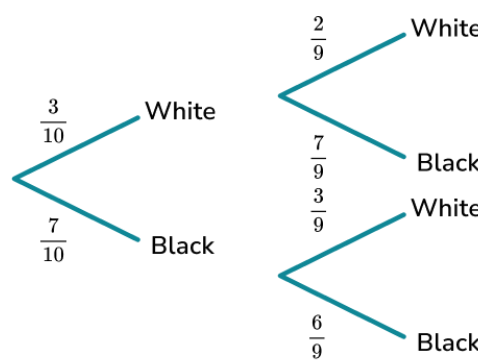
# Probability tree diagrams - Answers

	Question	Answer
	Applied Questions	
1)	<p><b>a)</b> A spinner has 8 sections. 3 sections are red and the remaining sections are white. The spinner is spun twice. Fill in the missing probabilities on the tree diagram.</p> <div style="text-align: center;"> <p><b>First spin:      Second spin:</b></p>  </div> <p><b>b)</b> Work out the probability that the spinner lands on red twice.</p>	<p><b>a)</b></p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p><b>First spin:</b></p>  </div> <div style="text-align: center;"> <p><b>Second spin:</b></p>  </div> </div> <p><b>b)</b> <math>\frac{3}{8} \times \frac{3}{8} = \frac{9}{64}</math></p>
2)	<p><b>a)</b> Maria plays tennis. The probability that she wins a match is 0.7. Maria plays 2 matches. Fill in the missing probabilities on the tree diagram.</p> <div style="text-align: center;"> <p><b>First match:      Second match:</b></p>  </div> <p><b>b)</b> Work out the probability that Maria wins at least one match.</p>	<p><b>a)</b></p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p><b>First match:</b></p>  </div> <div style="text-align: center;"> <p><b>Second match:</b></p>  </div> </div> <p><b>b)</b></p> $0.7 \times 0.7 = 0.49$ $0.7 \times 0.3 = 0.21$ $0.3 \times 0.7 = 0.21$ $0.49 + 0.21 + 0.21 = 0.91$

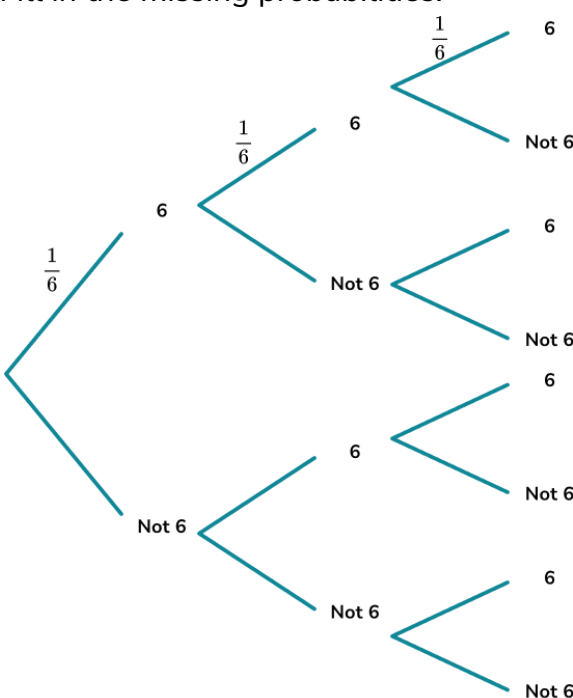
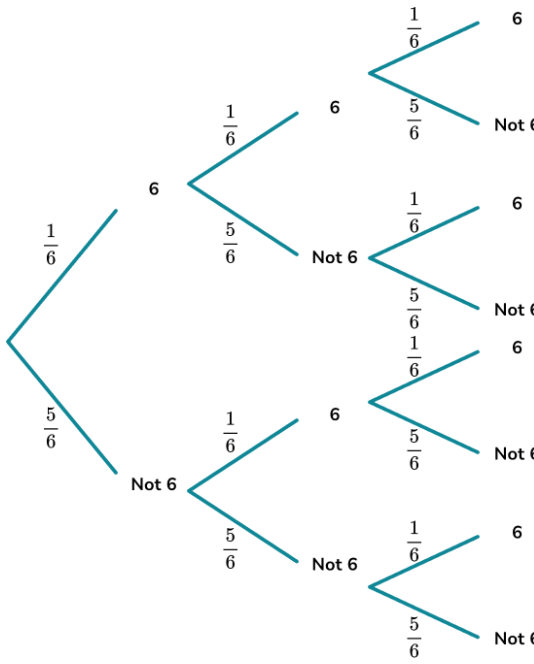


# Probability tree diagrams - Answers

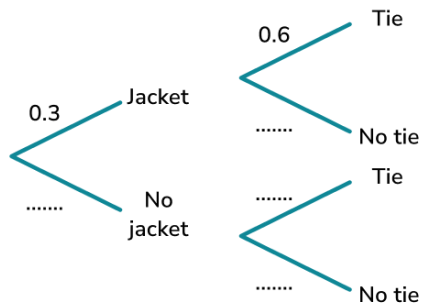
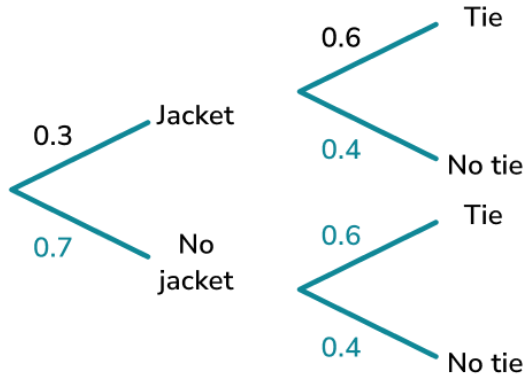
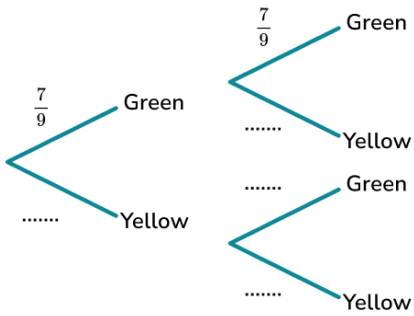
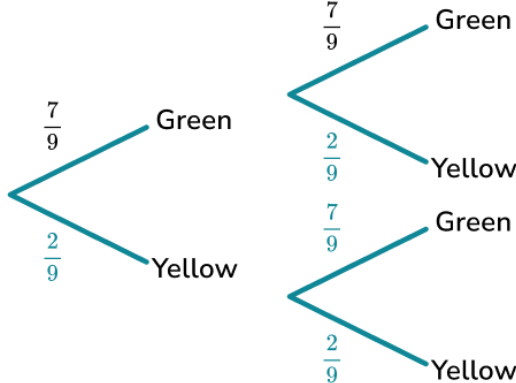
<b>3)</b>	<p><b>a)</b> 10 counters are in a bag. There are 3 white counters and the remaining counters are black. A counter is picked out at random. It is <b>not</b> replaced. A second counter is picked out at random. Fill in the missing probabilities on the tree diagram.</p> <div style="text-align: center;"> <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <th style="padding: 2px 10px;">First counter:</th><th style="padding: 2px 10px;">Second counter:</th></tr> <tr> <td colspan="2" style="height: 150px; vertical-align: middle;">  </td></tr> </table> </div> <p><b>b)</b> Work out the probability that one of each colour counter is picked.</p>	First counter:	Second counter:		
First counter:	Second counter:				
					

<p><b>a)</b></p> <div style="text-align: center;"> <table style="margin: 0 auto; border-collapse: collapse;"> <tr> <th style="padding: 2px 10px;">First counter:</th><th style="padding: 2px 10px;">Second counter:</th></tr> <tr> <td colspan="2" style="height: 150px; vertical-align: middle;">  </td></tr> </table> </div> <p><b>b)</b></p> $\frac{3}{10} \times \frac{7}{9} = \frac{21}{90}$ $\frac{7}{10} \times \frac{3}{9} = \frac{21}{90}$ $\frac{21}{90} + \frac{21}{90} = \frac{42}{90} = \frac{7}{15}$	First counter:	Second counter:		
First counter:	Second counter:			
				

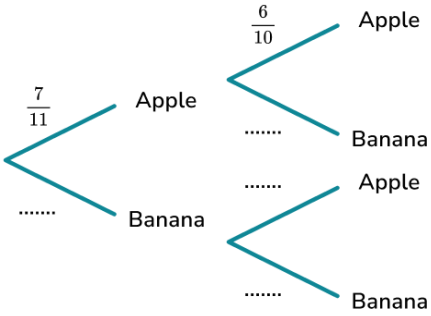
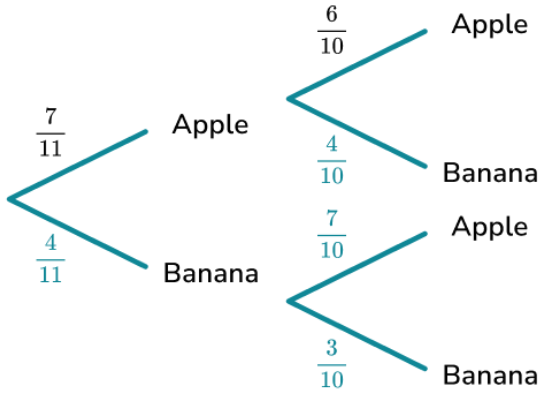
# Probability tree diagrams - Answers

<b>4)</b>	<p><b>a)</b> Three unbiased dice are rolled. Fill in the missing probabilities.</p>  <p><b>b)</b> Work out the probability that only one '6' is rolled.</p>	<p><b>a)</b></p>  <p><b>b)</b></p> $\frac{1}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{25}{216}$ $\frac{5}{6} \times \frac{1}{6} \times \frac{5}{6} = \frac{25}{216}$ $\frac{5}{6} \times \frac{5}{6} \times \frac{1}{6} = \frac{25}{216}$ $\frac{25}{216} + \frac{25}{216} + \frac{25}{216} = \frac{75}{216} = \frac{25}{72}$
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# Probability tree diagrams - Mark Scheme

	Question	Answer
	Exam Questions	
1) (a)	<p>Mr Jamal gets ready in the morning.</p> <p>The probability he wears a jacket is 0.3.</p> <p>The probability that he wears a tie is 0.6.</p> <p>Complete the tree diagram.</p> <div><div>First item:</div><div>Second item:</div></div>	<div><div>(a)</div><div><div>First item:</div><div>Second item:</div></div></div> <p>0.7 on the first set on branches</p> <p>0.4, 0.6, 0.4 on the second set of branches</p> <div><div>(1)</div><div>(1)</div></div>
(b)	Work out the probability that Mr Jamal wears a jacket and a tie.	<div><div>(b)</div><div><math>0.3 \times 0.6</math> <math>= 0.18</math></div><div><div>(1)</div><div>(1)</div></div></div>
2) (a)	<p>A bag contains only green and yellow counters.</p> <p>Sophie picks a counter at random and then replaces it.</p> <p>Sophie then picks a second counter.</p> <p>Complete the tree diagram.</p> <div><div>First counter:</div><div>Second counter:</div></div>	<div><div>(a)</div><div><div>First counter:</div><div>Second counter:</div></div></div> <p><math>\frac{2}{9}</math> on the first set on branches</p> <p><math>\frac{2}{9}, \frac{7}{9}, \frac{2}{9}</math> on the second set of branches</p> <div><div>(1)</div><div>(1)</div></div>

## Probability tree diagrams - Mark Scheme

<b>(b)</b>	Work out the probability that Sophie picks 2 green counters.	<b>(b)</b> $\frac{7}{9} \times \frac{7}{9}$ $= \frac{49}{81}$	<b>(1)</b> <b>(1)</b>
<b>(c)</b>	Work out the probability that Sophie picks at least one green counter.	<b>(c)</b> $\left(\frac{7}{9} \times \frac{7}{9}\right) + \left(\frac{7}{9} \times \frac{2}{9}\right) + \left(\frac{2}{9} \times \frac{7}{9}\right)$ $= \frac{49}{81} + \frac{14}{81} + \frac{14}{81} = \frac{77}{81}$	<b>(1)</b> <b>(1)</b>
<b>3) (a)</b>	<p>There are 7 apples and 4 bananas in a fruit bowl. A piece of fruit is selected at random. It is eaten. A second piece of fruit is selected at random and is also eaten.</p> <p>Complete the tree diagram.</p> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <span>First item:</span> <span>Second item:</span> </div> 	<b>(a)</b> <div style="display: flex; justify-content: space-around; margin-bottom: 10px; background-color: #e0f2f1; padding: 5px;"> <span>First item:</span> <span>Second item:</span> </div>  <p><math>\frac{4}{11}</math> on the first set on branches</p> <p><math>\frac{4}{10}, \frac{7}{10}, \frac{3}{10}</math> on the second set of branches</p>	<b>(1)</b> <b>(1)</b>
<b>(b)</b>	Work out the probability that one of each type of fruit is eaten.	<b>(b)</b> $\frac{7}{11} \times \frac{4}{10} = \frac{28}{110}$ <b>or</b> $\frac{4}{11} \times \frac{7}{10} = \frac{28}{110}$ $"\frac{28}{110}" + "\frac{28}{110}"$ $= \frac{56}{110}$ <b>oe</b>	<b>(1)</b> <b>(1)</b> <b>(1)</b>

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