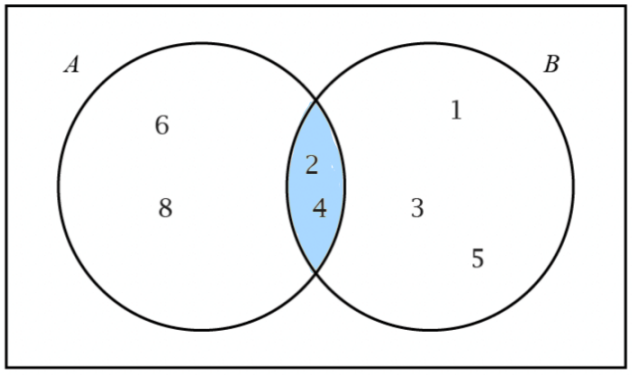
No calculators are permitted in this exercise.

Ex 12.1

Worked Example for Simple Questions

Name:

Which option shows the intersection of sets A and B?



* The intersection is where the circles overlap. It is the things in both set A and set B.

A	B	C
$\{1,3,5\}$	$\{2,4\}$	$\{6,8\}$

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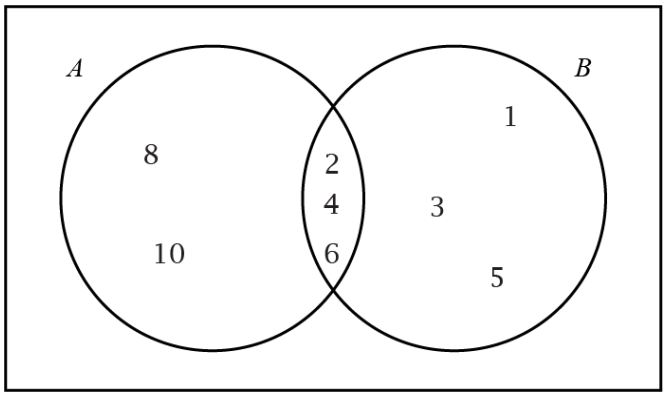
Intersections in Venn Diagrams

Question 1

Which option shows the intersection of sets A and B?



Circle the correct option

A

$\{2, 4, 6\}$

B

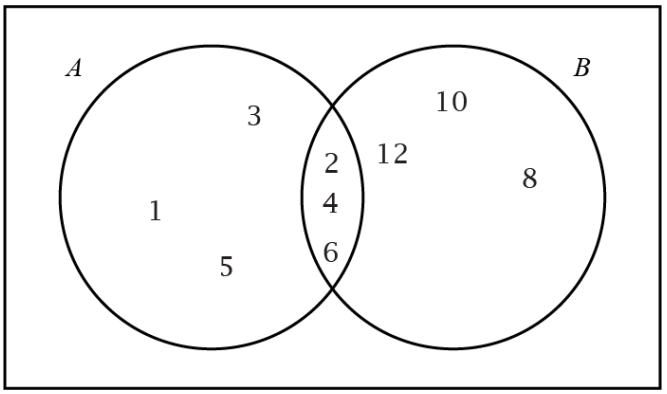
$\{1, 3, 5\}$

C

$\{8, 10\}$

Question 2

Which option shows the intersection of sets A and B?



Circle the correct option

A

$\{1, 3, 5\}$

B

$\{2, 4, 6\}$

C

$\{8, 10, 12\}$

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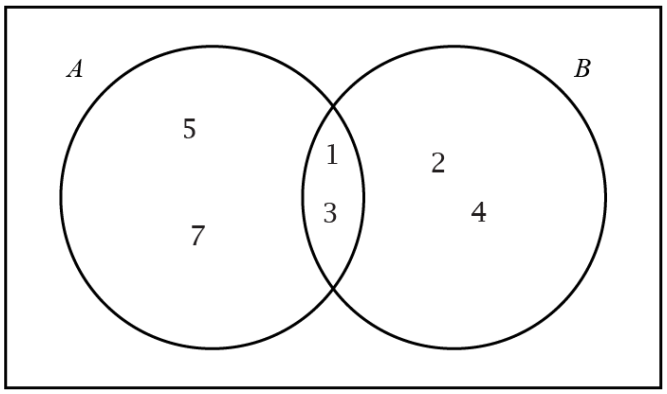
Question 3

Which option shows the intersection of sets A and B?



Circle the correct option

A

$\{5, 7\}$

B

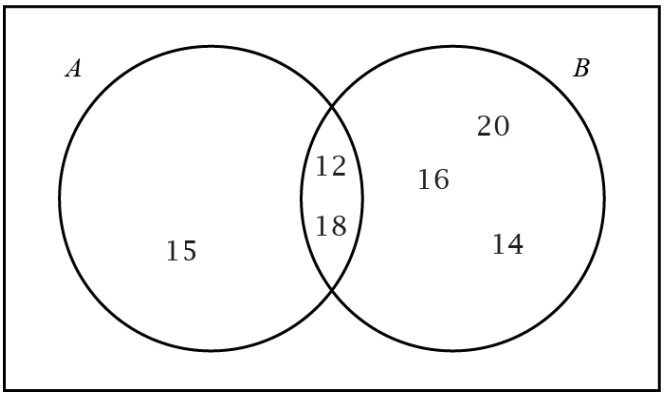
$\{2, 4\}$

C

$\{1, 3\}$

Question 4

Which option shows the intersection of sets A and B?



Circle the correct option

A

$\{12, 18\}$

B

$\{14\}$

C

$\{14, 16, 20\}$

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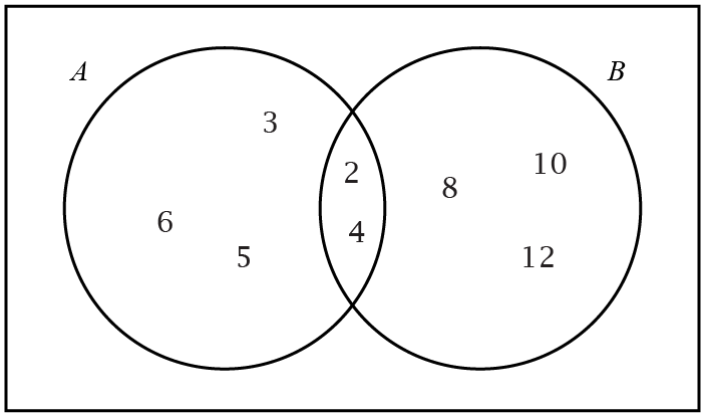
Question 5

Which option shows the intersection of sets A and B?



Circle the correct option

A

$\{3, 5, 6\}$

B

$\{2, 4\}$

C

$\{8, 10, 12\}$

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Worked Example for Standard Questions

For set A and set B:

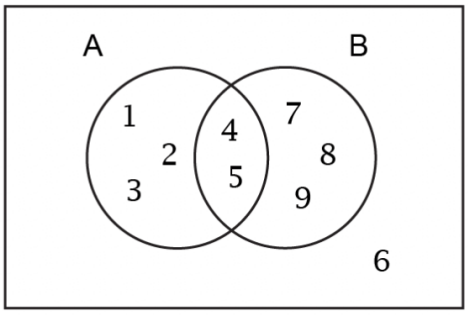
where the circles overlap

A intersection B $= \{7, 8, 9\}$

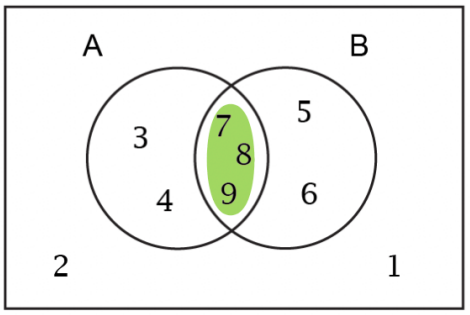
the numbers in the overlap

Which one could be the Venn Diagram? B

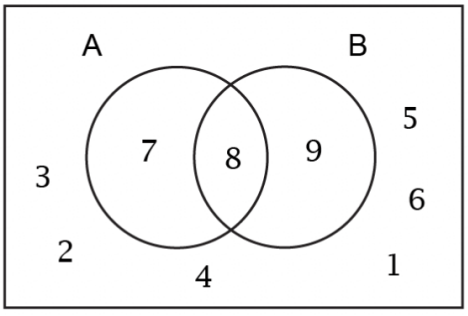
A



B



C



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Question 6

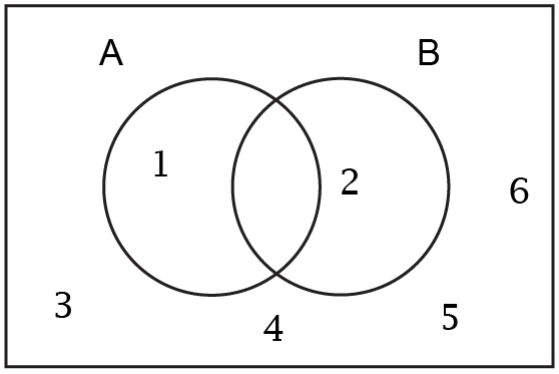
For set A and set B:

A intersection B $= \{1, 2\}$

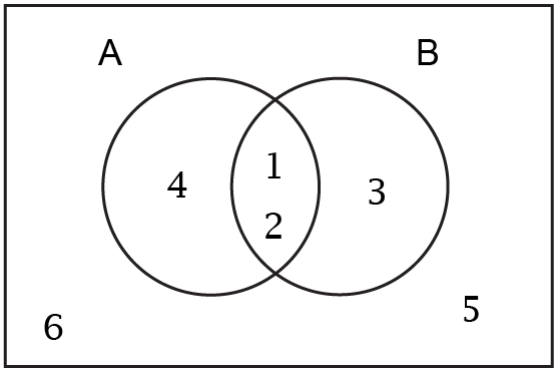
Which one could be the Venn Diagram?

Circle the correct option

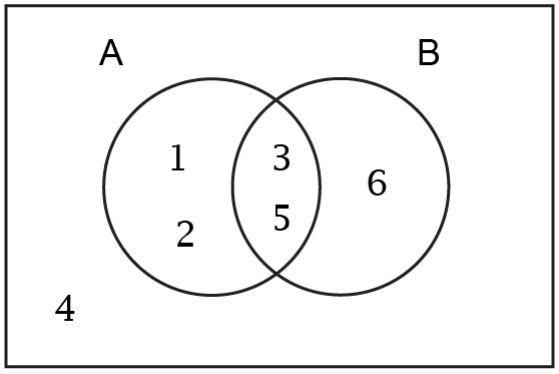
A



B



C



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Question 7

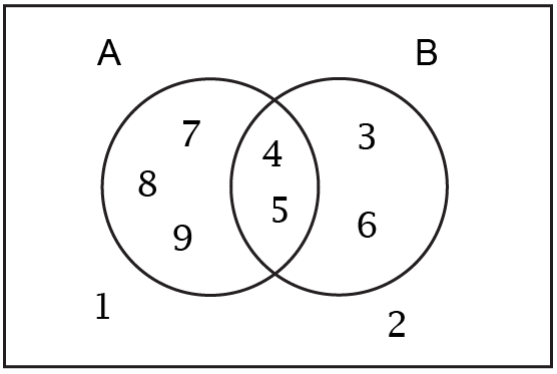
For set A and set B:

A intersection B $= \{7, 8, 9\}$

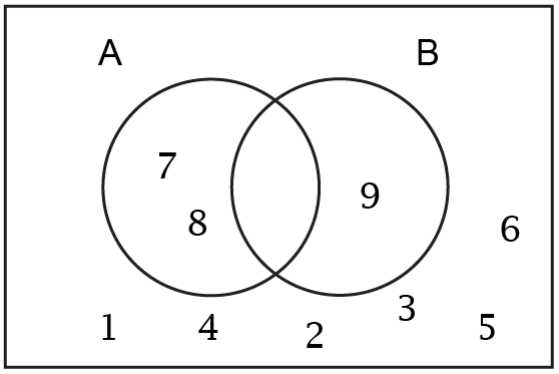
Which one could be the Venn Diagram?

Circle the correct option

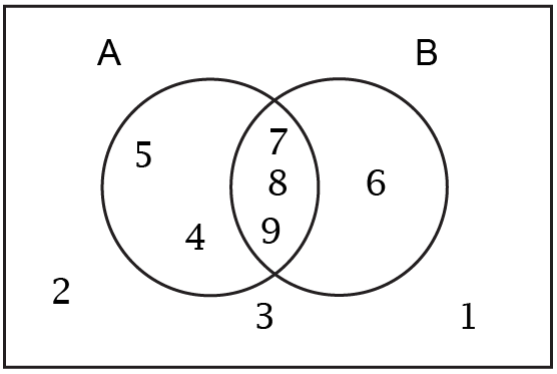
A



B



C



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Question 8

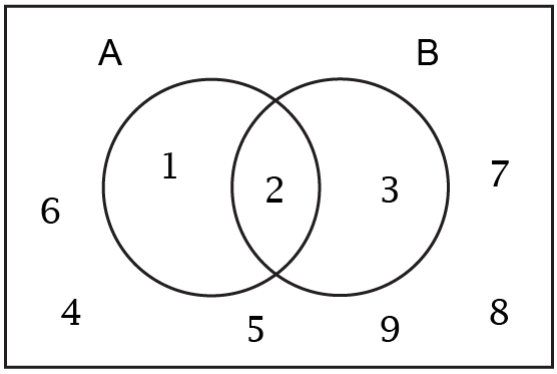
For set A and set B:

A intersection B $= \{1, 2, 3\}$

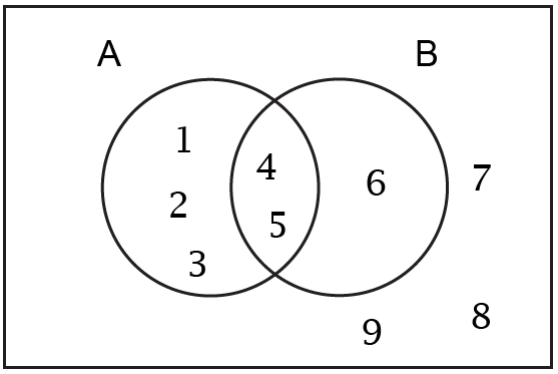
Which one could be the Venn Diagram?

Circle the correct option

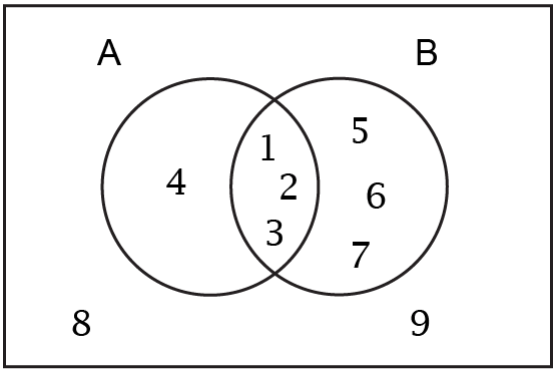
A



B



C



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Question 9

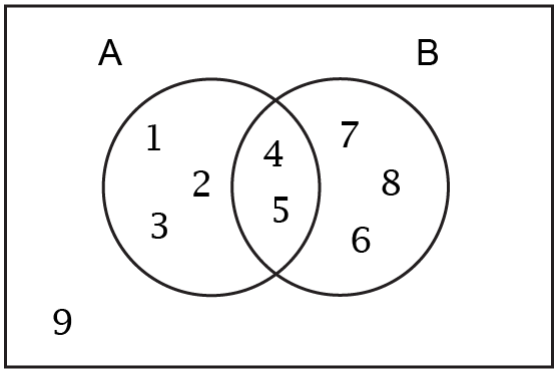
For set A and set B:

A intersection B $= \{1, 2, 3\}$

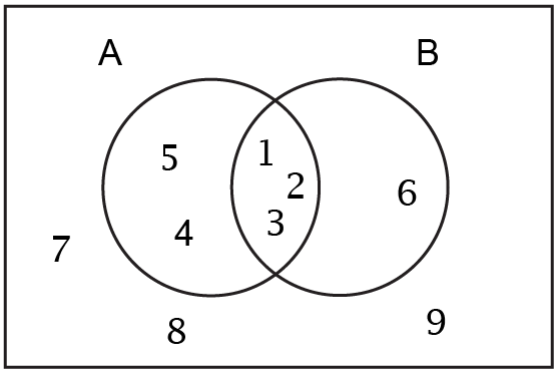
Which one could be the Venn Diagram?

Circle the correct option

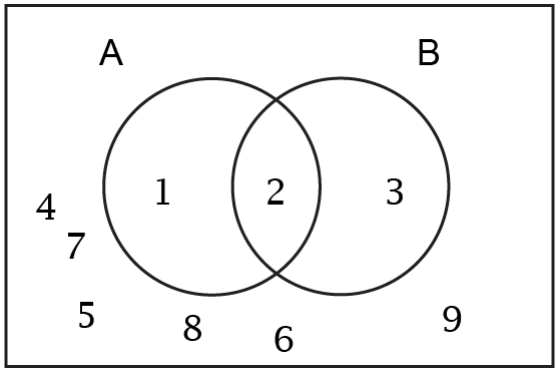
A



B



C



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Question 10

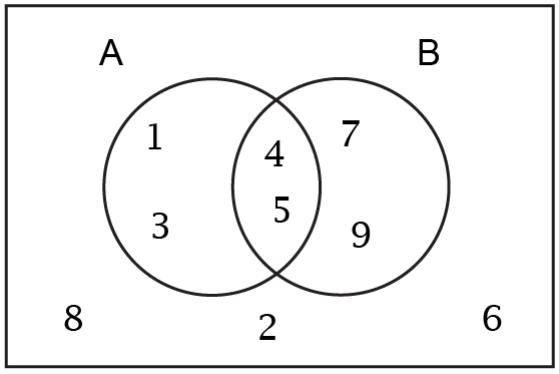
For set A and set B:

A intersection B $= \{1, 3\}$

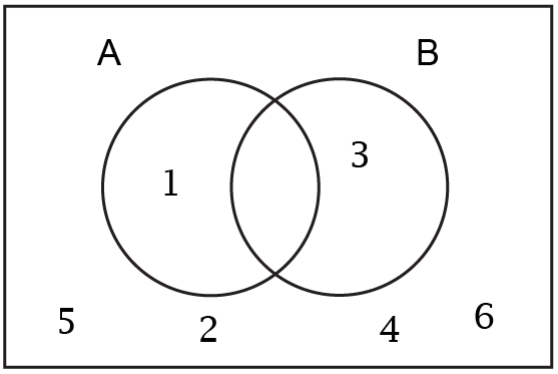
Which one could be the Venn Diagram?

Circle the correct option

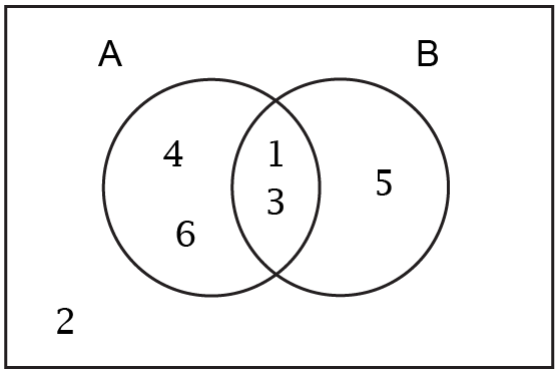
A



B



C



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Ex 12.3

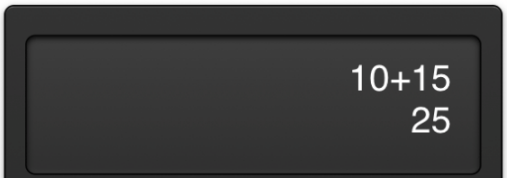
A calculator is permitted throughout this exercise.

Worked Example for Simple Questions

90 people are asked about eating pizza and playing cards.

Complete the two-way table by filling in the missing total.

	Eat pizza	Don't eat pizza	**Total**
Play cards	20	10	**30**
Don't play cards	45	15	**60**
Total	**65**	25	**90**



The total is the sum of the numbers in that column.

Total = 10 + 15
= 25

Question 1

70 people were asked about swimming and eating pizza.

Complete the two-way table by filling in the missing total.

	Can swim	Can not swim	**Total**
Eat pizza	20	7	**27**
Don't eat pizza	30	13	
Total	**50**	**20**	**70**

Question 2

60 people were asked about eating apples and playing soccer.

Complete the two-way table by filling in the missing total.

	Eat apples	Don't eat apples	**Total**
Play soccer	20	20	**40**
Don't play soccer	15	5	**20**
Total		**25**	**60**

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Question 3

120 people were asked about drinking tea and eating biscuits.

Complete the two-way table by filling in the missing total.

	Drink tea	Don't drink tea	**Total**
Eat biscuits	61	6	
Don't eat biscuits	44	9	**53**
Total	**105**	**15**	**120**

Question 4

100 people were asked about owning a cat and a dog.

Complete the two-way table by filling in the missing total.

	Own a cat	Don't own a cat	**Total**
Own a dog	20	35	
Don't own a dog	40	5	**45**
Total	**60**	**40**	**100**

Question 5

100 people were asked about owning a cat and a dog.

Complete the two-way table by filling in the missing total.

	Own a cat	Don't own a cat	**Total**
Own a dog	10	35	**45**
Don't own a dog	50	5	**55**
Total	**60**		**100**

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Worked Example for Standard Questions

110 people were surveyed.

They were asked about colours that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes green	Doesn't like green	Total
Likes yellow	29	47	76
Doesn't like yellow	25	9	34
Total	54	56	110

29 + 47 = 76

54 − 29 = 25

47 + 9 = 56

* Find the missing numbers so that all the rows and columns add up to the totals

---

Question 6

150 people were surveyed.

They were asked about activities that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes rock climbing	Doesn't like rock climbing	**Total**
Likes mountain bike riding	37		**102**
Doesn't like mountain bike riding	16	32	
Total		**97**	**150**

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Question 7

200 people were surveyed.

They were asked about activities that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes knitting	Doesn't like knitting	**Total**
Likes drawing		97	**128**
Doesn't like drawing	51	21	
Total	**82**		**200**

Question 8

100 people were surveyed.

They were asked about foods that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes burgers	Doesn't like burgers	**Total**
Likes hot dogs		15	**70**
Doesn't like hot dogs	26	4	
Total	**81**		**100**

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Question 9

80 people were surveyed.

They were asked about colours that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes orange	Doesn't like orange	**Total**
Likes purple		23	**34**
Doesn't like purple	19	27	
Total	**30**		**80**

Question 10

120 people were surveyed.

They were asked about colours that they liked or didn't like.

Fill in the blanks to complete the two-way table showing the results.

	Likes green	Doesn't like green	**Total**
Likes pink	43	56	
Doesn't like pink	18		**21**
Total		**59**	**120**

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Ex 12.5

No calculators are permitted in this exercise.

Worked Example for Simple Questions

90 students are surveyed.

The results are shown in a two-way table below:

	Eat pizza	Don't eat pizza	**Total**
Play cards	23	7	**30**
Don't play cards	42	18	**60**
Total	**65**	**25**	**90**

where they cross/intersect

What is the probability that a student eats pizza **and** plays cards?

$$Pr(\text{eats pizza and plays cards}) = \frac{23}{90}$$

Question 1

75 students are surveyed.

The results are shown in a two-way table below:

	Like Music	Don't like Music	**Total**
Play softball	14	11	**25**
Don't play softball	32	18	**50**
Total	**46**	**29**	**75**

What is the probability that a student likes Music **and** plays softball?

$$Pr(\text{likes Music and plays softball}) = \frac{\square}{75}$$

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Question 2

80 students are surveyed.

The results are shown in a two-way table below:

	Like Art	Don't like Art	**Total**
Play rugby	13	27	**40**
Don't play rugby	25	15	**40**
Total	**38**	**42**	**80**

What is the probability that a student likes art **and** plays rugby?

$$Pr(\text{likes Art and plays rugby}) = \frac{\square}{80}$$

Question 3

100 students are surveyed.

The results are shown in a two-way table below:

	Like English	Don't like English	**Total**
Play netball	29	15	**44**
Don't play netball	33	23	**56**
Total	**62**	**38**	**100**

What is the probability that a student likes English **and** plays netball?

$$Pr(\text{likes English and plays netball}) = \frac{\square}{100}$$

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Question 4

60 students are surveyed.

The results are shown in a two-way table below:

	Like Science	Don't like Science	**Total**
Play volleyball	7	25	**32**
Don't play volleyball	23	5	**28**
Total	**30**	**30**	**60**

What is the probability that a student likes Science **and** plays volleyball?

$$Pr(\text{likes Science and plays volleyball}) = \frac{\square}{60}$$

Question 5

100 students are surveyed.

The results are shown in a two-way table below:

	Like Maths	Don't like Maths	**Total**
Play tennis	17	23	**40**
Don't play tennis	27	33	**60**
Total	**44**	**56**	**100**

What is the probability that a student likes Maths **and** plays tennis?

$$Pr(\text{likes Maths and plays tennis}) = \frac{\square}{100}$$

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Worked Example for Standard Questions

60 students are surveyed.

The results are shown in a two-way table below:

	Like Science	Don't like Science	**Total**
Play volleyball	13	19	**32**
Don't play volleyball	12	16	**28**
Total	**25**	**35**	**60**

What is the probability that a student doesn't like Science **and** plays volleyball?

where they intersect/cross

$$\Pr(\text{doesn't like Science and plays volleyball}) = \frac{19}{60}$$

← Total number of students surveyed

Question 6

100 students are surveyed.

The results are shown in a two-way table below:

	Like Maths	Don't like Maths	**Total**
Play tennis	17	23	**40**
Don't play tennis	27	33	**60**
Total	**44**	**56**	**100**

What is the probability that a student doesn't like Maths **and** plays tennis?

$$\Pr(\text{doesn't like Maths and plays tennis}) = \frac{\square}{\square}$$

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Question 7

100 students are surveyed.

The results are shown in a two-way table below:

	Like English	Don't like English	**Total**
Play netball	29	15	**44**
Don't play netball	33	23	**56**
Total	**62**	**38**	**100**

What is the probability that a student doesn't like English **and** doesn't play netball?

$$\Pr(\text{doesn't like English and doesn't play netball}) = \frac{\square}{\square}$$

Question 8

100 students are surveyed.

The results are shown in a two-way table below:

	Like English	Don't like English	**Total**
Play netball	23	17	**40**
Don't play netball	31	29	**60**
Total	**54**	**46**	**100**

What is the probability that a student likes English **and** doesn't play netball?

$$\Pr(\text{likes English and doesn't play netball}) = \frac{\square}{\square}$$

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Question 9

80 students are surveyed.

The results are shown in a two-way table below:

	Like Art	Don't like Art	**Total**
Play rugby	11	27	**38**
Don't play rugby	23	19	**42**
Total	**34**	**46**	**80**

What is the probability that a student likes Art **and** doesn't play rugby?

$$\Pr(\text{likes Art and doesn't play rugby}) = \frac{\square}{\square}$$

Question 10

80 students are surveyed.

The results are shown in a two-way table below:

	Like Art	Don't like Art	**Total**
Play rugby	13	27	**40**
Don't play rugby	25	15	**40**
Total	**38**	**42**	**80**

What is the probability that a student doesn't like Art **and** plays rugby?

$$\Pr(\text{doesn't like Art and plays rugby}) = \frac{\square}{\square}$$

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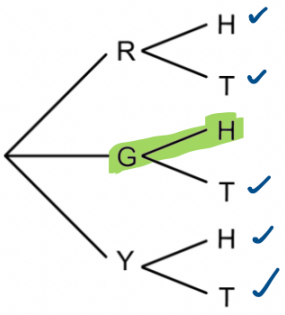
Ex 12.7

No calculators are permitted in this exercise.

Worked Example for Simple Questions

A spinner with red (R), green (G) and yellow (Y) is spun and then a coin is tossed.

Here is a tree diagram showing all the possible outcomes.



* Find the missing outcome

Fill in the blank to complete the list of possible outcomes.

$S = \{RH, RT, \boxed{GH}, GT, YH, YT\}$

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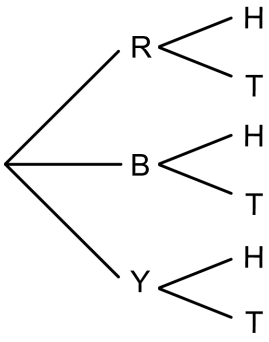
Question 1

A spinner with red (R), blue (B) and yellow (Y) is spun and then a coin is tossed.

Here is a tree diagram showing all the possible outcomes.



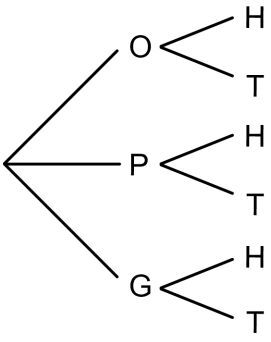
Fill in the blank to complete the list of possible outcomes.

$S = \{\text{RH, RT, BH, BT, } \square \text{, YT}\}$

Question 2

A spinner with orange (O), purple (P) and green (G) is spun and then a coin is tossed.

Here is a tree diagram showing all the possible outcomes.



Fill in the blank to complete the list of possible outcomes.

$S = \{\text{OH, OT, PH, } \square \text{, GH, GT}\}$

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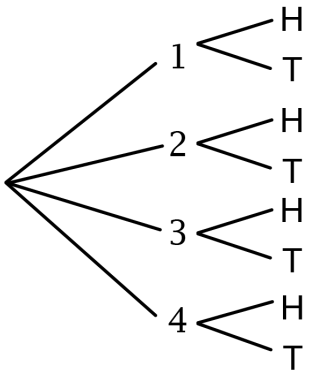
Question 3

A four-sided die is tossed with sides $(1, 2, 3, 4)$ and then a coin is tossed.

Here is a tree diagram showing all the possible outcomes.



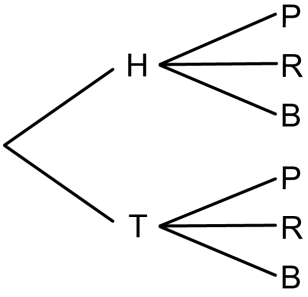
Fill in the blank to complete the list of possible outcomes.

$S = \{1\text{H}, 1\text{T}, \square, 2\text{T}, 3\text{H}, 3\text{T}, 4\text{H}, 4\text{T}\}$

Question 4

A coin is tossed and then a spinner with purple (P), red (R) and black (B) is spun.

Here is a tree diagram showing all the possible outcomes.



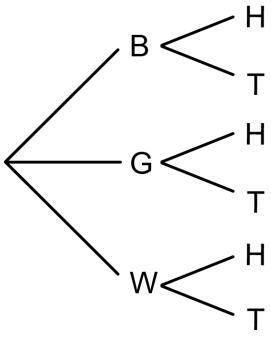
Fill in the blank to complete the list of possible outcomes.

$S = \{\text{HP, HR, HB, } \square\text{, TR, TB}\}$

Question 5

A spinner with brown (B), green (G) and white (W) is spun and then a coin is tossed.

Here is a tree diagram showing all the possible outcomes.



Fill in the blank to complete the list of possible outcomes.

$S = \{\text{BH, } \square\text{, GH, GT, WH, WT}\}$

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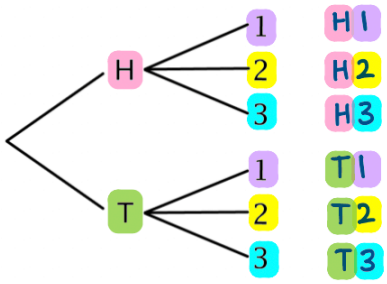
Worked Example for Standard Questions

Finn has a coin and a spinner with the numbers 1, 2 and 3.

He tosses the coin and then spins the spinner.

The tree diagram below shows all the possible outcomes.



* Follow the branches of the tree diagram to find all the possible outcomes

Fill in the blanks to complete the list of possible outcomes.

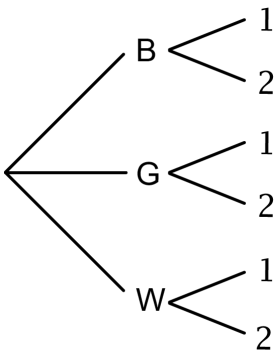
$S = \{$ H1 , H2 , H3 , T1 , T2 , T3 $\}$

Question 6

Paul randomly selects a counter from a bag filled with blue (B), green (G) and white (W) counters.

He then spins a spinner with 1s and 2s on it.

The tree diagram below shows all the possible outcomes.



Fill in the blanks to complete the list of possible outcomes.

$S = \{$ ____ , ____ , ____ , ____ , ____ , ____ $\}$

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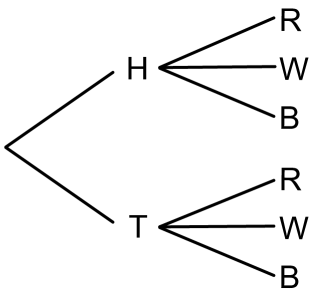
Question 7

Gary has a coin and a box containing red (R), white (W) and black (B) counters.

He tosses the coin and then selects a counter from the box without looking.

The tree diagram below shows all the possible outcomes.



Fill in the blanks to complete the list of possible outcomes.

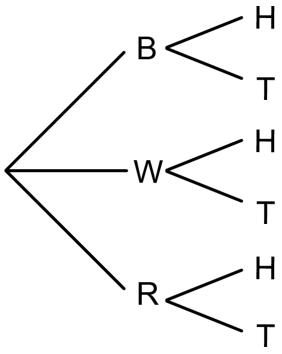
$S = \{ \square , \square , \square , \square , \square , \square \}$

Question 8

Thalia has a coin and a bag filled with blue (B), white (W) and red (R) pompoms.

She randomly picks a pompom from the bag and then tosses the coin.

The tree diagram below shows all the possible outcomes.



Fill in the blanks to complete the list of possible outcomes.

$S = \{ \square , \square , \square , \square , \square , \square \}$

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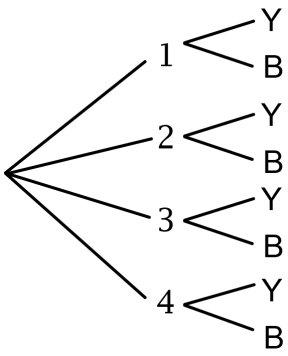
Question 9

Jess has a four-sided die and spinner with yellow (Y) and blue (B) sections.

She rolls the die and then spins the spinner.

The tree diagram below shows all the possible outcomes.



Fill in the blanks to complete the list of possible outcomes.

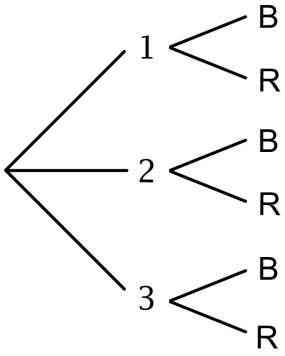
$S = \{ \square, \square, \square, \square, \square, \square, \square, \square \}$

Question 10

Jay has a spinner with the numbers 1, 2 and 3 and a bag filled with blue (B) and red (R) balls.

He spins the spinner and then randomly chooses a ball from the bag.

The tree diagram below shows all the possible outcomes.



Fill in the blanks to complete the list of possible outcomes.

$S = \{ \square, \square, \square, \square, \square, \square \}$

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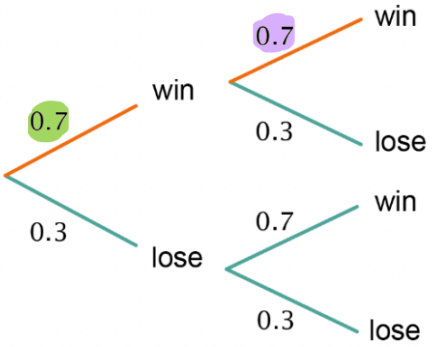
Ex 12.9

A scientific calculator is permitted throughout this exercise.

Worked Example for Simple Questions

Jackson plays a game where the probability of winning is 0.7 and the probability of losing is 0.3.

He plays the game twice.



What is the probability he will **win** both games?

$\Pr(\text{win and win}) = 0.7 \times 0.7$

$= 0.49$

A	B	C
0.49	0.6	0.14



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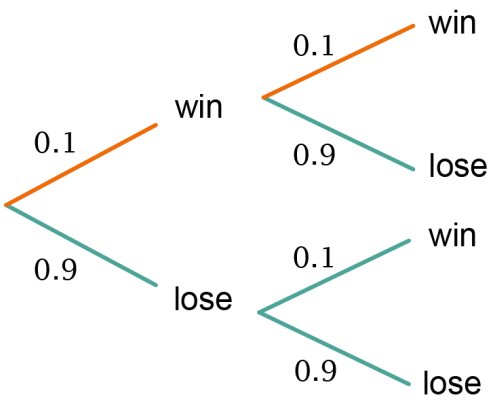
Tree Diagrams with Replacement

Question 1

June plays a game where the probability of winning is 0.1 and the probability of losing is 0.9.

She plays the game twice.



What is the probability she will win both games?

Circle the correct option

A

0.1

B

0.5

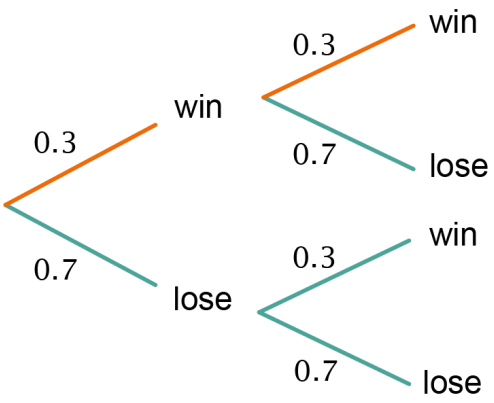
C

0.01

Question 2

Jude plays a game where the probability of winning is 0.3 and the probability of losing is 0.7.

He plays the game twice.



What is the probability he will win both games?

Circle the correct option

A

0.09

B

0.5

C

0.3

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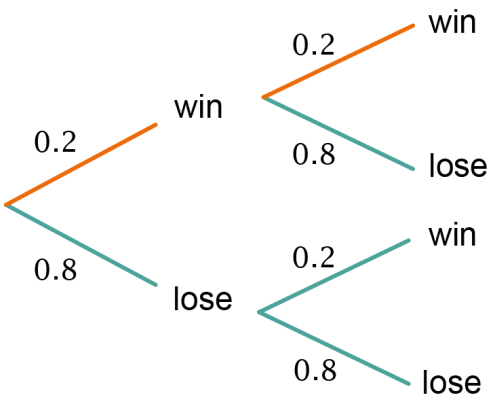
Tree Diagrams with Replacement

Question 3

Jasmine plays a game where the probability of winning is 0.2 and the probability of losing is 0.8.

She plays the game twice.



What is the probability she will win both games?

Circle the correct option

A

0.5

B

0.2

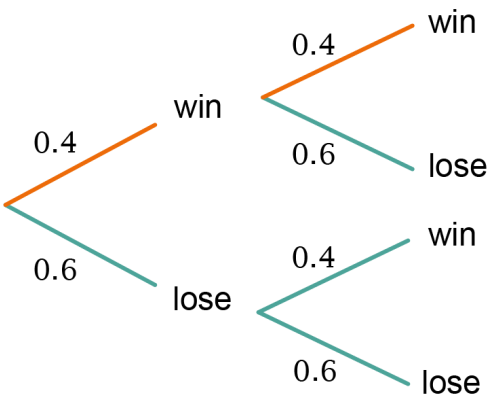
C

0.04

Question 4

Jack plays a game where the probability of winning is 0.4 and the probability of losing is 0.6.

He plays the game twice.



What is the probability he will win both games?

Circle the correct option

A

0.4

B

0.16

C

0.5

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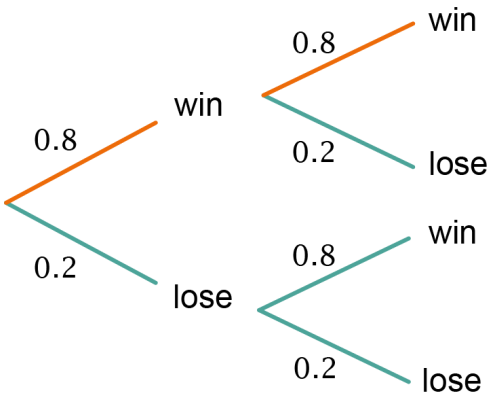
Question 5

Jett plays a game where the probability of winning is 0.8 and the probability of losing is 0.2.

He plays the game twice.



What is the probability he will win both games?

Circle the correct option

A

0.5

B

0.64

C

0.8

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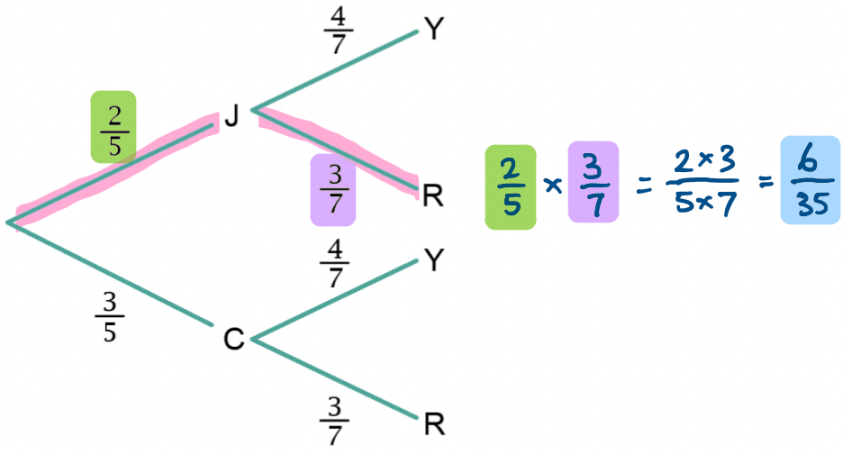
Worked Example for Standard Questions

Here is a tree diagram showing the branch probabilities.



$\frac{2}{5} \times \frac{3}{7} = \frac{2 \times 3}{5 \times 7} = \frac{6}{35}$

What is the probability of the outcome JR?

$$\Pr(\text{JR}) = \frac{6}{35}$$

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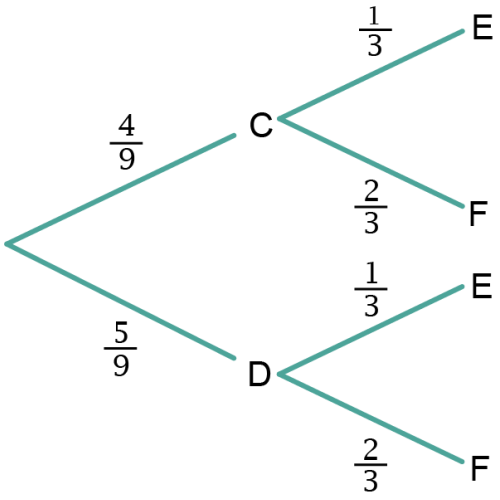
Tree Diagrams with Replacement

Question 6

Here is a tree diagram showing the branch probabilities.

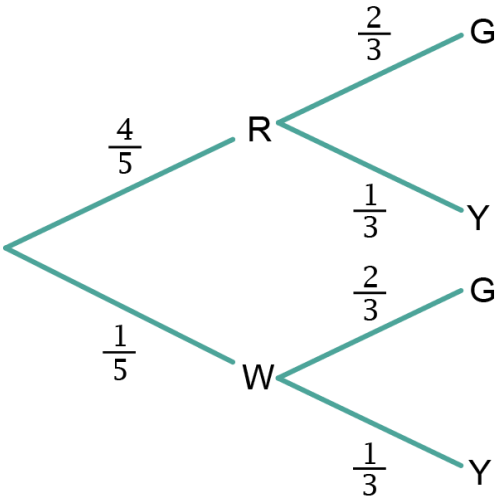


What is the probability of the outcome DE?

$$\Pr(\mathrm{DE}) = \frac{\square}{\square}$$

Question 7

Here is a tree diagram showing the branch probabilities.



What is the probability of the outcome WG?

$$\Pr(\mathrm{WG}) = \frac{\square}{\square}$$

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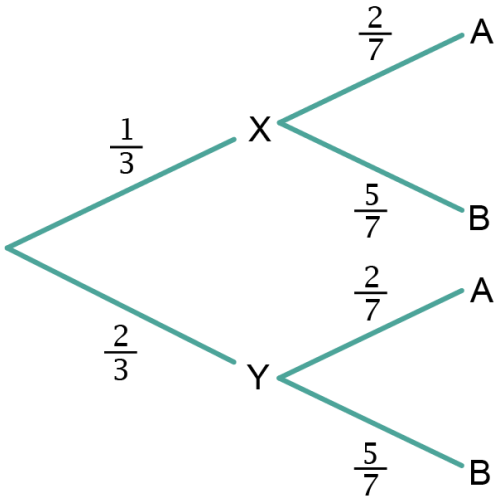
Tree Diagrams with Replacement

Question 8

Here is a tree diagram showing the branch probabilities.

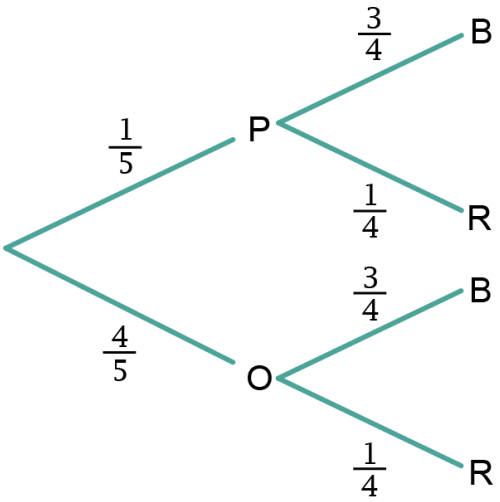


What is the probability of the outcome XB?

$$\Pr(\mathrm{XB}) = \frac{\square}{\square}$$

Question 9

Here is a tree diagram showing the branch probabilities.



What is the probability of the outcome PR?

$$\Pr(\mathrm{PR}) = \frac{\square}{\square}$$

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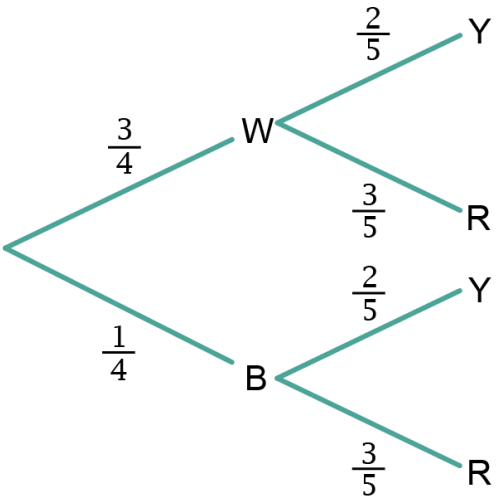
Question 10

Here is a tree diagram showing the branch probabilities.



What is the probability of the outcome WR?

$$\Pr(\mathrm{WR}) = \frac{\square}{\square}$$

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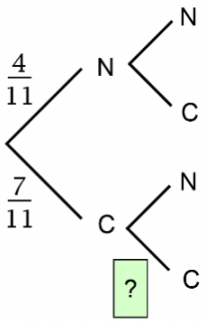
Ex 12.11

No calculators are permitted in this exercise.

Worked Example for Simple Questions

Finn has 4 nuggets and 7 chips on his plate.

He randomly selects two items **without putting the first one back on his plate**.



One chip(C) has been taken $7-1=6$ chips left

With one chip taken there is $11-1=10$ things left

$= \frac{6}{10}$

What fraction goes in the box?

6

10

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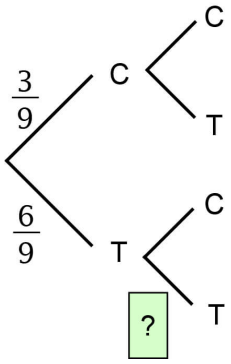
Tree Diagrams Without Replacement

Question 1

Albert has 3 carrot sticks and 6 cherry tomatoes in his lunchbox.

He randomly selects two veggies **without putting the first one back in his lunchbox**.



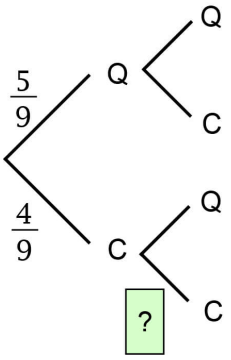
What fraction goes in the box?

Fraction: $\frac{\square}{\square}$

Question 2

Amir has 5 qukes and 4 carrot sticks in his lunchbox.

He randomly selects two veggies **without putting the first one back in his lunchbox**.



What fraction goes in the box?

Fraction: $\frac{\square}{\square}$

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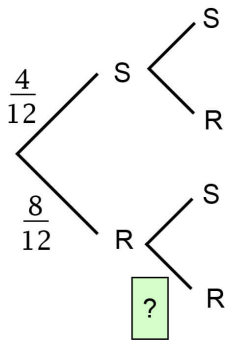
Tree Diagrams Without Replacement

Question 3

Ren has 4 sausages and 8 rice cakes in her bowl.

She randomly selects two items **without putting the first one back in her bowl**.



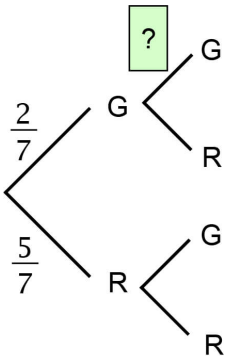
What fraction goes in the box?

Fraction: $\frac{\square}{\square}$

Question 4

Jan has 2 green books and 5 red books in her bag.

She randomly selects two books **without putting the first book back in her bag**.



What fraction goes in the box?

Fraction: $\frac{\square}{\square}$

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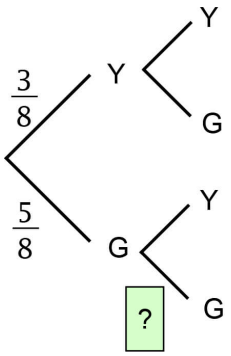
Tree Diagrams Without Replacement

Question 5

Jenny has 3 yellow cards and 5 green cards in her bag.

She randomly selects two cards **without putting the first card back in her bag**.



What fraction goes in the box?

Fraction: $\frac{\square}{\square}$

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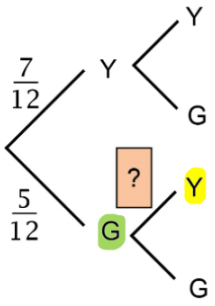
Worked Example for Standard Questions

Jenny has 7 yellow cards and 5 green cards in her bag.

She randomly selects two cards **without putting the first card back in her bag**.



One green card (G) has been taken, so there are still 7 yellow cards (Y) left.

With one card taken there are 12 − 1 = 11 cards left

$? = \frac{7}{11}$

What fraction goes in the box on the tree diagram?

$\frac{7}{11}$

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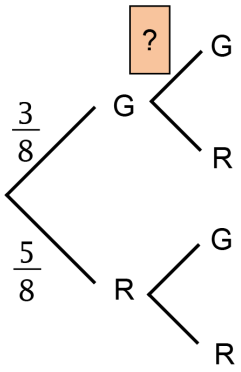
Question 6

Jan has 3 green books and 5 red books in her bag.

She randomly selects two books **without putting the first book back in her bag**.



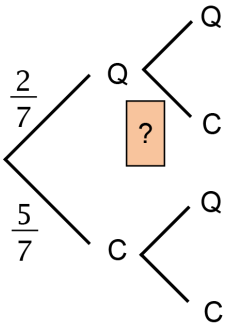
What fraction goes in the box on the tree diagram?

$\frac{\square}{\square}$

Question 7

Amir has 2 qukes and 5 carrot sticks in his lunchbox.

He randomly selects two veggies **without putting the first one back in his lunchbox**.



What fraction goes in the box on the tree diagram?

$\frac{\square}{\square}$

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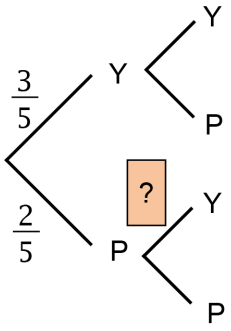
Question 8

Josh has 3 yellow cars and 2 pink cars in his bag.

He randomly selects two cars **without putting the first car back in his bag**.



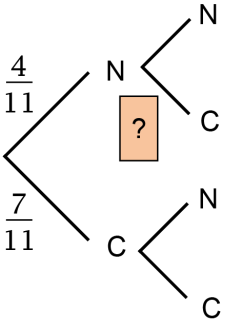
What fraction goes in the box on the tree diagram?

$\frac{\square}{\square}$

Question 9

Finn has 4 nuggets and 7 chips on his plate.

He randomly selects two items **without putting the first one back on his plate**.



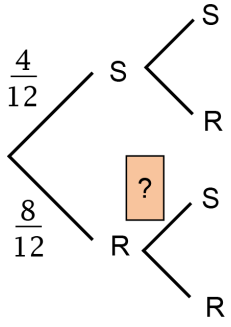
What fraction goes in the box on the tree diagram?

$\frac{\square}{\square}$

Question 10

Ren has 4 sausages and 8 rice cakes in her bowl.

She randomly selects two items **without putting the first one back in her bowl**.



What fraction goes in the box on the tree diagram?

$\frac{\square}{\square}$

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