

Student Name

Mathematics Stage 5 Paths

PROBABILITY B

Book 1 Solve problems involving Venn diagrams and 2-way tables

Version: 260207

Report mistakes & suggest improvements:
<https://MrDingMaths.com>

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OVERVIEW

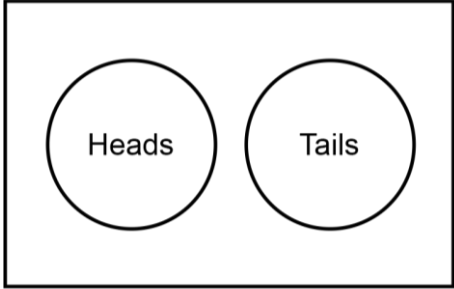
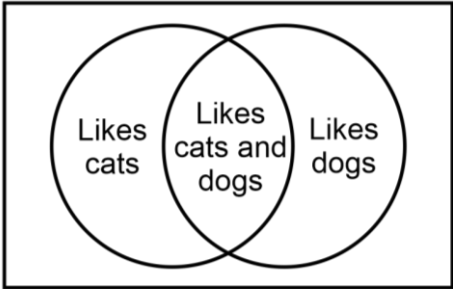
SYLLABUS CONTENT

MA5-PRO-P-01 solves problems involving Venn diagrams, 2-way tables and conditional probability

Solve problems involving Venn diagrams and 2-way tables

- Represent and interpret data in Venn diagrams for mutually exclusive and non-mutually exclusive events
- Construct Venn diagrams to represent all possible combinations of 2 attributes from given or collected data
- Interpret data in 2-way tables to represent relationships between attributes
- Construct 2-way tables to represent the relationships between attributes
- Convert between representations of the relationships between 2 attributes in Venn diagrams and 2-way tables
- Define a set as a collection of distinct objects
- Use Venn diagrams, set language and notation for events, including $\bar{A}$ (or A' or A^c) for the complement of an event A , $A \cap B$ for 'A and B' (the intersection of events A and B) and $A \cup B$ for 'A or B' (the union of events A and B) and recognise mutually exclusive events

INTERPRETING VENN DIAGRAMS AND TWO-WAY TABLES

Mutually Exclusive	Non-mutually exclusive
- Mutually exclusive events cannot occur at the same time. - The Venn diagram does not overlap.  Tossing a coin	- Non-mutually exclusive events can occur at the same time. - The Venn diagram overlaps.  Liking cats and dogs

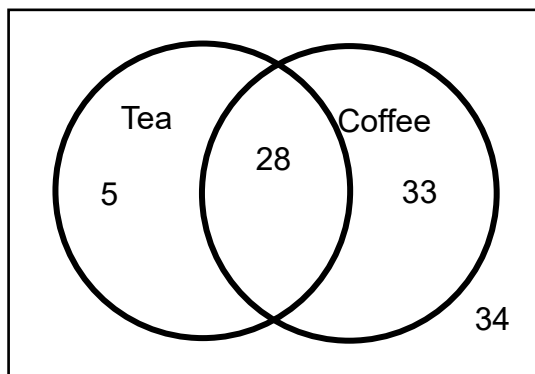
- An event and its complement are always mutually exclusive.

Example Identify mutually and non-mutually exclusive events.

Liking maths, liking science	Mutually Exclusive	Non-Mutually Exclusive
Liking maths, not liking maths.	Mutually Exclusive	Non-Mutually Exclusive
Even number, odd number	Mutually Exclusive	Non-Mutually Exclusive
Owning a dog, owning a cat	Mutually Exclusive	Non-Mutually Exclusive
Prime number, composite number	Mutually Exclusive	Non-Mutually Exclusive
Tossing a head, tossing a tail	Mutually Exclusive	Non-Mutually Exclusive
Having a tail, having four legs	Mutually Exclusive	Non-Mutually Exclusive
Picking a red card, picking a Queen	Mutually Exclusive	Non-Mutually Exclusive
Winning a game, losing a game	Mutually Exclusive	Non-Mutually Exclusive

VENN DIAGRAMS AND TWO-WAY TABLES

- Venn diagrams and two-way tables show how two different attributes connect with each other

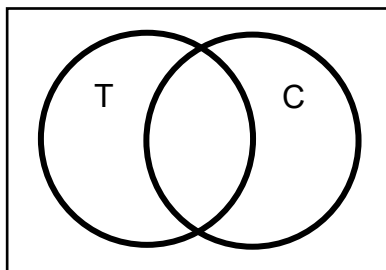


	Likes Tea	Dislikes Tea	Total
Likes Coffee	28	33	61
Dislikes Coffee	5	34	39
Total	33	67	100

Example Interpret Venn diagrams and Two-way tables.

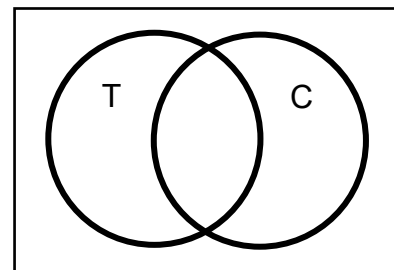
Shade the area on the Venn diagram and two-way table that represents:

a People who like tea



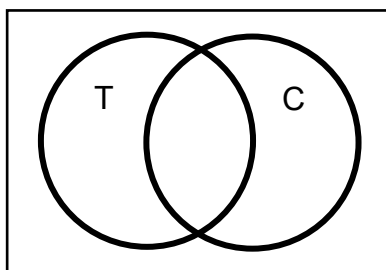
	T	Not T	Total
C			
Not C			
Total			

b People who like coffee



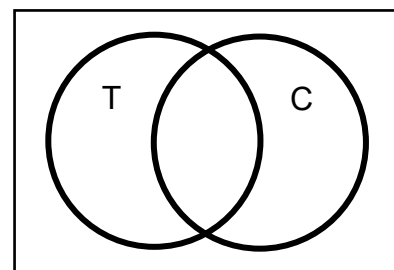
	T	Not T	Total
C			
Not C			
Total			

c People who like tea only



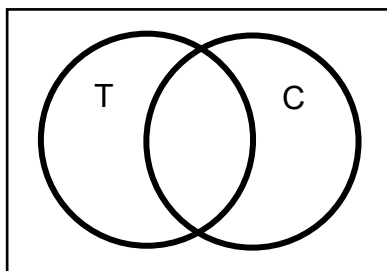
	T	Not T	Total
C			
Not C			
Total			

d People who like coffee only



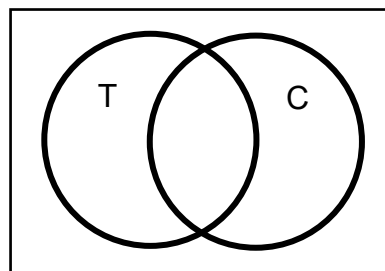
	T	Not T	Total
C			
Not C			
Total			

e People who like both tea and coffee



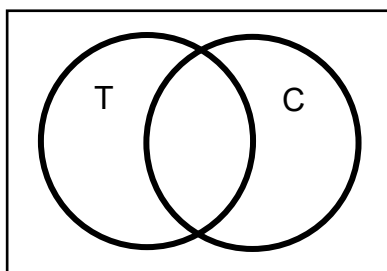
	T	Not T	Total
C			
Not C			
Total			

f People who like tea or people who like coffee



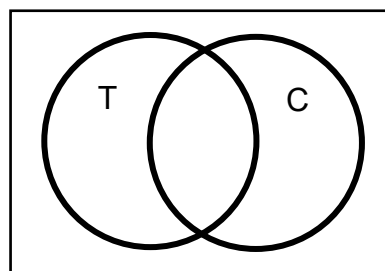
	T	Not T	Total
C			
Not C			
Total			

g People who don't like tea



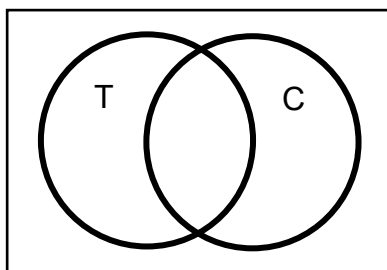
	T	Not T	Total
C			
Not C			
Total			

h People who don't like coffee



	T	Not T	Total
C			
Not C			
Total			

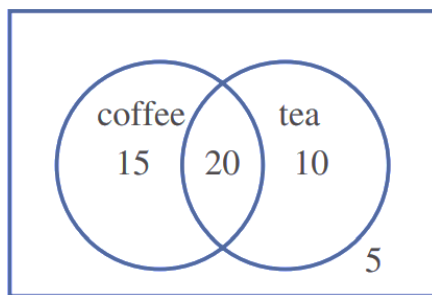
i People who like neither tea nor coffee



	T	Not T	Total
C			
Not C			
Total			

Example Interpreting Venn Diagrams and two-way tables

A survey was conducted to see people's preferences on tea and coffee.
The data was arranged as a Venn diagram and a two-way table.

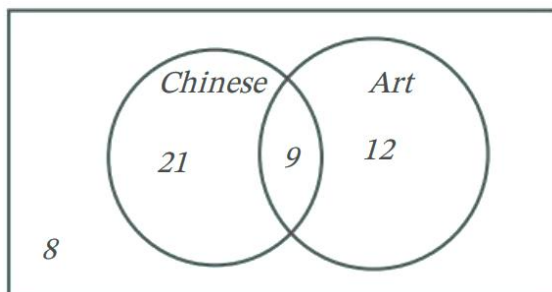


	Coffee	Not Coffee	Total
Tea	20	10	30
Not Tea	15	5	20
Total	35	15	50

How many students:

a Were surveyed? 50	b Like tea and coffee? 20
c Like tea or coffee? 45	d Like neither tea nor coffee? 5
e Like coffee only? 15	f Like tea only? 10
g Like tea? 30	h Like coffee? 35
i Dislike coffee? 15	j Dislike tea? 20
k What is the probability that a randomly selected person likes tea? $\frac{30}{50} = \frac{3}{5}$	l What is the probability that a randomly selected person likes both? $\frac{20}{50} = \frac{2}{5}$

Some year 9 students were surveyed about whether they took Chinese or Art as an elective.

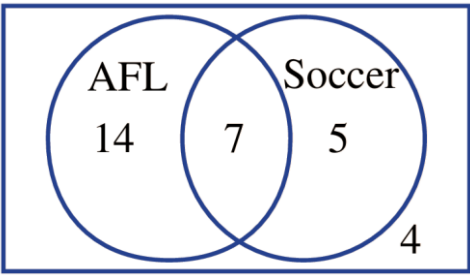


	Chinese	Not Chinese	Total
Art	9	12	21
Not Art	21	8	29
Total	30	20	50

How many students:

a Were surveyed? 50	b Take Chinese and art? 9
c Take Chinese or art? 42	d Take neither Chinese nor art? 9
e Take Art only? 12	f Take Chinese only? 21
g Take Art? 21	h Take Chinese? 30
i Don't take Chinese? 20	j Don't take art? 29
k What is the probability that a randomly chosen person takes art? 21/50	l What is the probability that a randomly chosen person takes Chinese only? 21/50

1 The results of a survey of sports students play is shown in the Venn diagram below.



How many students:

a were surveyed?	b play both AFL and soccer?
c play neither AFL nor soccer?	d play soccer?
e play AFL?	f play AFL only?
g don't play AFL?	h don't play soccer?

2 At a car yard, cars were surveyed to see whether they are petrol cars or electric cars.

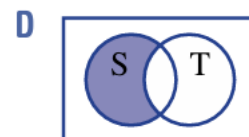
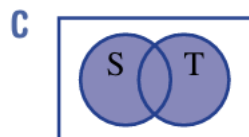
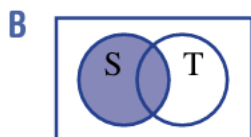
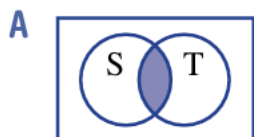
	Electric	Not Electric	Total
Petrol	3	15	18
Not Petrol	5	1	6
Total	8	16	24

How many cars:

a were surveyed?	b are both petrol and electric?
c are neither petrol nor electric.	d are petrol or electric?
e are not electric?	f are electric?
g are petrol only?	h are electric only?

1 Match the diagrams with the given description.

- a S b S only c S and T d S or T



2 The two-way table below shows the results of a poll conducted of a group of students who own mobile phones to find out who pays their own bills.

	Boys	Girls	Total
Pay own bill	4	7	11
Do not pay own bill	8	7	15
Total	12	14	26

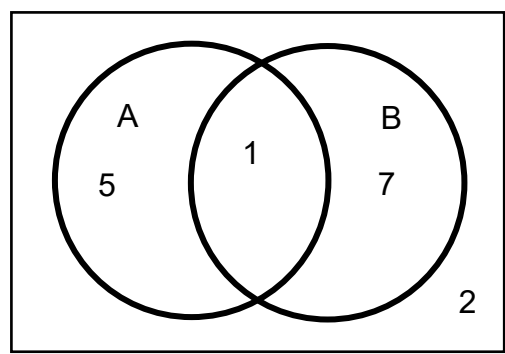
- a How many students participated in this poll?
- b How many participants were boys?
- c How many of the students surveyed pay their own bill?
- d Find the probability that a randomly selected participant:
- is a boy who pays his own bill
 - is a girl who pays her own bill
 - is a girl
 - does not pay their own bill
- 3 Forty men completed a survey about home ownership and car ownership. The results are shown in the two-way table below.

	Own car	Do not own car	Total
Own home	8	2	10
Do not own home	17	13	30
Total	25	15	40

If a survey participant is chosen at random, give the probability that:

- a he owns a car and a home
- b he owns a car but not a home
- c he owns a home

4 For each diagram, find the following probabilities.
 You will need to calculate the total number in the sample first.



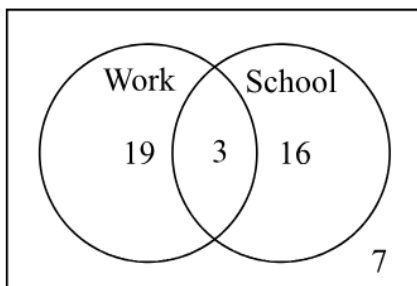
- a $P(A) = \frac{6}{15} = \frac{2}{5}$
- b $P(A \text{ only})$
- c $P(\text{not } B)$
- d $P(A \text{ and } B)$
- e $P(A \text{ or } B)$
- f $P(\text{Neither } A \text{ nor } B)$

	A	Not A	Total
B	3	19	22
Not B	12	1	13
Total	15	20	35

- a $P(A)$
- b $P(A \text{ only})$
- c $P(\text{not } B)$
- d $P(A \text{ and } B)$
- e $P(A \text{ or } B)$
- f $P(\text{Neither } A \text{ nor } B)$

- 5 Zilda took a survey of eighteen year olds, asking if they work, go to school, do both or neither. The Venn diagram shows the results.

What is the probability that a person randomly selected goes to school and works, rounded to three decimal places?



0.067

6 **2014 HSC Standard 2 Band 3**

A group of 150 people was surveyed and the results recorded. A person is selected at random from the surveyed group.

	<i>Owens a mobile</i>	<i>Does not own a mobile</i>	<i>Total</i>
<i>Male</i>	42	28	70
<i>Female</i>	63	17	80
	105	45	150

What is the probability that the person selected is a male who does not own a mobile?

- A. $\frac{28}{150}$ C. $\frac{28}{70}$
 B. $\frac{45}{150}$ D. $\frac{45}{70}$

A

7 **2016 HSC Standard 2 Band 6**

A group of 485 people was surveyed. The people were asked whether or not they smoke. The results are recorded in the table.

	<i>Smokers</i>	<i>Non-smokers</i>	<i>Total</i>
<i>Male</i>	88	176	264
<i>Female</i>	68	153	221
	156	329	485

A person is selected at random from the group.

What is the approximate probability that the person selected is a smoker OR is male?

- A. 33% C. 68%
 B. 18% D. 87%

C

CONSTRUCTING VENN DIAGRAMS AND TWO-WAY TABLES

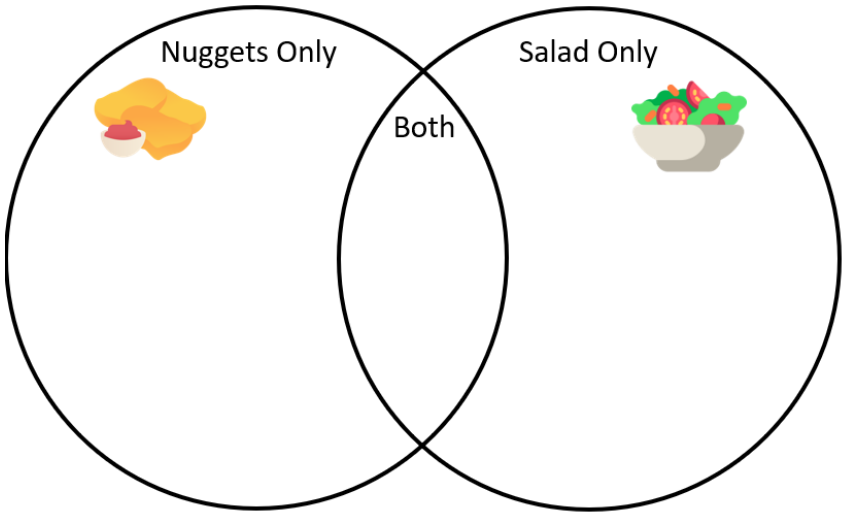
Investigation Constructing two-way tables and Venn Diagrams.

12 friends are at a party.
9 people eat chicken nuggets.
6 people eat salad.
2 people eat neither.



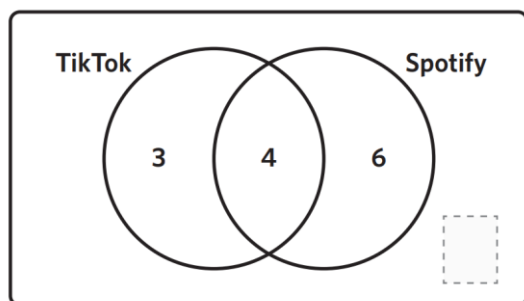
Key idea: Fill in what you know, then use subtraction to figure out the rest.

	Nuggets	Not Nuggets	Total
Salad			
Not Salad			
Total			

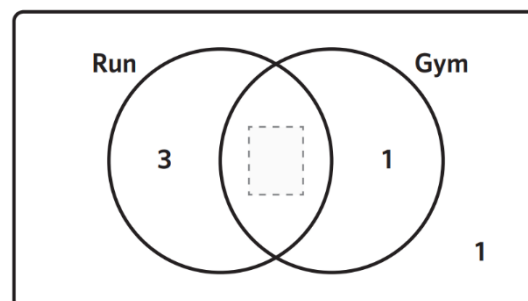


1 Finish these Venn diagrams with the given information.

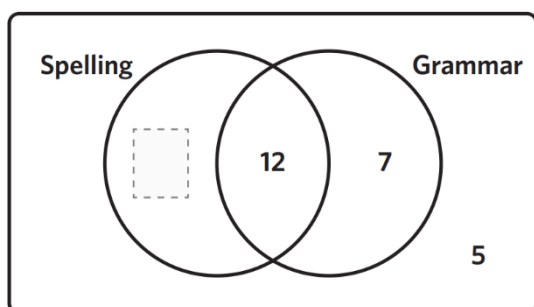
- a 15 students are asked whether they use TikTok and Spotify. 7 use TikTok, 10 use Spotify and 2 students don't use either.



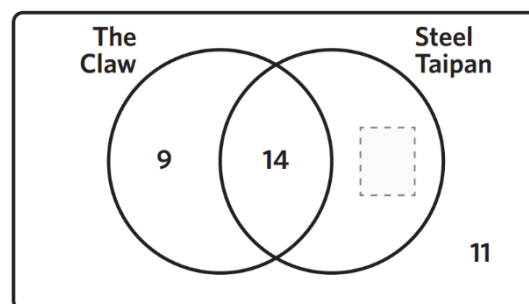
- b 30 athletes are asked whether they run or go to the gym as part of their training. 27 run, 25 go to the gym and 1 person, who is injured, says that they do neither.



- c 28 people are asked whether they are confident at spelling and grammar. 12 confident at both, 5 aren't confident with either and 19 confident at grammar.



- d 50 visitors are surveyed on their way out from a waterpark. 23 people went on The Claw, 30 people went on the Taipan and 11 people did not go on either.



2 Fill in the blanks in these two way tables.

a

	Baby	Adult	Total
Female	2	4	6
Male		3	6
Total	5	7	12

b

	Siblings	No siblings	Total
Single parent		1	9
Two parents	12	3	15
Total	20		24

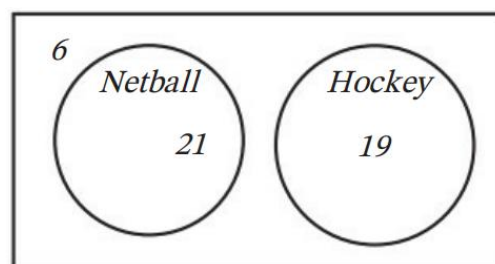
c

	Childcare	No childcare	Total
Working			21
Not working	2	7	9
Total	19	11	30

3

a Is playing netball and playing hockey mutually exclusive?

b Is playing neither netball nor hockey and playing netball mutually exclusive?



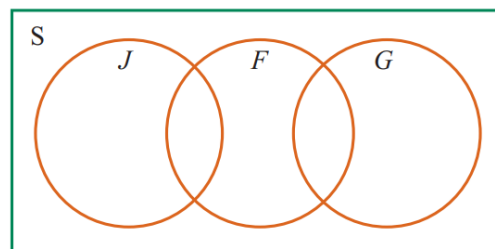
4 This three-way Venn diagram shows students studying Japanese, French, and German. Determine whether these events are mutually exclusive:

a Studying Japanese, studying French

b Studying Japanese, studying German

c Studying Japanese and German, studying French and German.

d Write another event that is mutually exclusive.



5 Fill in the missing numbers in these tables.

a

	A	Not A	Total
B	7	8	
Not B		1	
Total	10		

b

	A	Not A	Total
B	2		7
Not B		4	
Total			20

6 Draw a Venn diagram of this scenario:

Blue eyes: 32

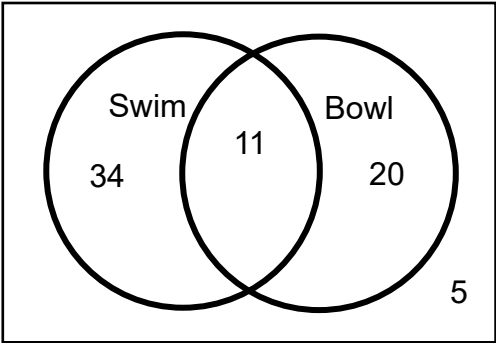
Brown eyes: 38

Neither blue nor brown eyes: 10



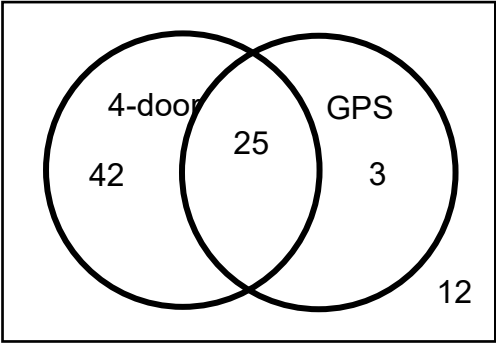
7 Convert between these Venn diagrams and two-way tables.

a

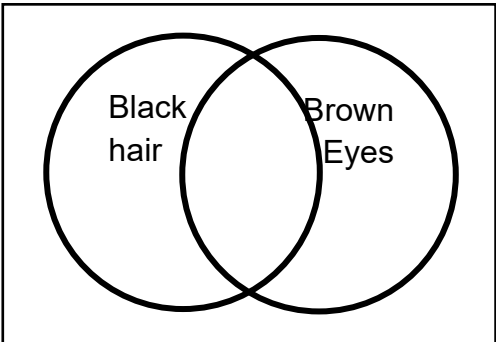


	Swim	Not Swim	Total
Bowl			
Not Bowl			
Total			

b

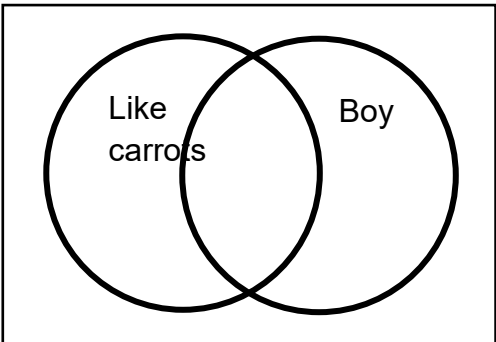


c



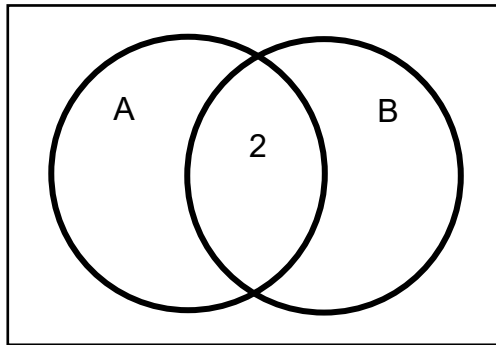
	Black hair	Not black hair	Total
Brown eyes	11	6	17
Not brown eyes	5	8	13
Total	16	14	30

d



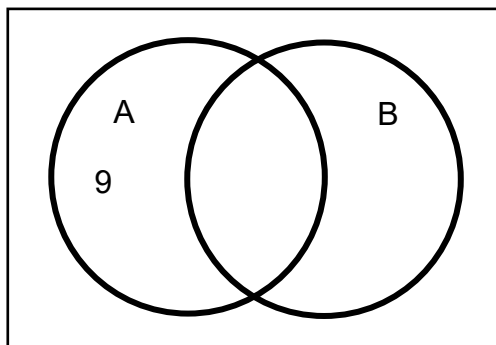
	Likes carrots	Dislikes carrots	Total
Boy	75		200
Not boy		40	
Total	145		

e



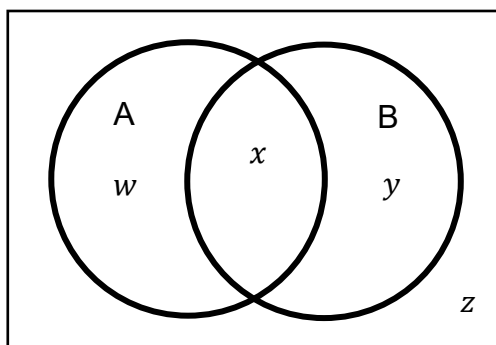
	A	Not A	Total
B			8
Not B			
Total		7	12

f



	A	Not A	Total
B		4	
Not B			13
Total	12		

g



	A	Not A	Total
B	x		
Not B			
Total	$x + y$		

8 The table shows information about 50 people at a restaurant. Complete the table.

	Wear glasses	Do not wear glasses	Total
Males	15	8	
Females	9		
Total			

a What fraction of the males wear glasses?

b What percentage of the people at the restaurant wear glasses?

- 9 The Tourism Council surveyed 130 people to find whether they prefer New South Wales or Queensland as a holiday destination.

NSW: 44

QLD: 66

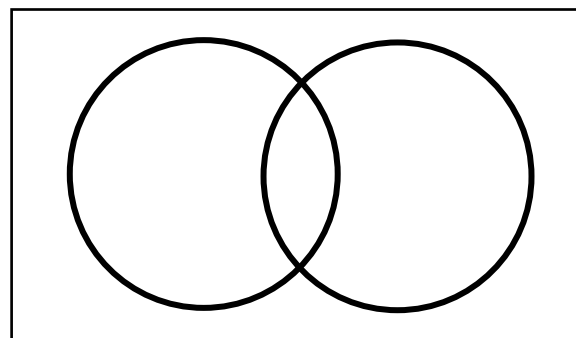
NSW and QLD: 20

a Calculate $P(\text{NSW and QLD})$

b Calculate $P(\text{NSW only})$

c Calculate $P(\text{neither NSW nor QLD})$

d Explain why $P(\text{NSW and QLD})$ is NOT $\frac{20}{44+66+20}$



- 10 Theresa collects information on 30 animals to see if there is a relationship between how much an animal sleeps and whether they are a predator. The information is shown as a two-way table.

	Predator	Not Predator	Total
Sleeps < 12 hours	3	13	
Sleeps $\geq$ 12 hours	10	4	
Total			

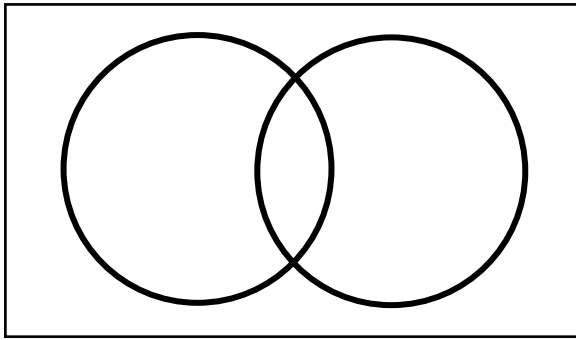
a Fill in the total row and column.

b How many animals sleep at least 12 hours a day and are not predators? 7

c What is the probability that an animal picked at random is a predator and sleeps less than 12 hours a day, but not both?

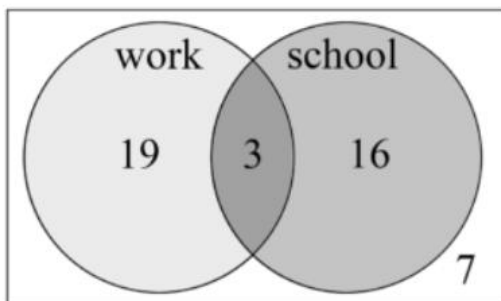
d What can you conclude from this information?

- 11 A page of text has 150 words on it: 30 are nouns, 10 of which start with a vowel. Of the words that are not nouns, 85 of them do not start with vowels. Create a two-way table and Venn diagram of this situation.

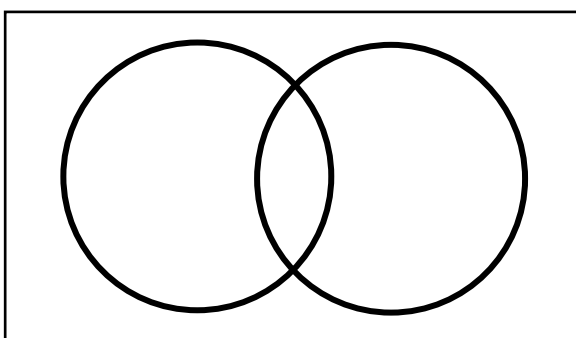


			Total
Total			

- a What is the probability that a randomly chosen word is not a noun?
- b What is the probability that a randomly chosen word starts with a vowel and is not a noun?
- c What is the probability that a randomly chosen word starts with a vowel?
- 12 Zilda asked 45 eighteen-year-olds whether they work, go to school, do both or do neither. What is the probability that a person randomly selected from the group goes to school and works, rounded to three decimal places?



- 13 A group of university students were surveyed to see if they need glasses. There is a total of 82 males and 98 females. 22 of the males need glasses and 85 of the females do not need glasses. There were 145 students who do not need glasses. Complete the Venn diagram and table.



			Total
Total			

- 14 120 children are asked how they travel to school.
- Two-thirds of those asked are boys.
- 26 girls walk to school.
- Twice as many boys don't-walk to school as girls.
- Use a two-way table to work out how many boys walk to school.

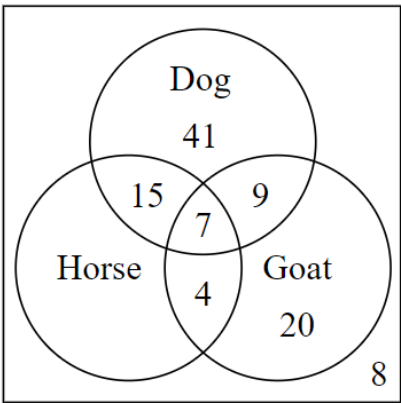
- 15 **2007 HSC Standard 2 Band 4**
- Leanne copied a two-way table into her book.

	<i>Male</i>	<i>Female</i>	<i>Totals</i>
<i>Full-time work</i>	279	356	635
<i>Part-time work</i>	187	439	716
<i>Totals</i>	466	885	1351

Leanne made an error in copying one of the values in the shaded section of the table.

Which of the four values has been incorrectly copied?

- 16 A school surveyed 120 of its students about the type of animals they have at home. The results are recorded in the Venn diagram below, although the number of students who only own horses is missing.
- If one of the students is selected at random, what is the probability that the student does not own a goat?



17 2010 HSC Standard 2 Band 4

A group of 347 people was tested for flu and the results were recorded. The flu test results are not always accurate.

A person is selected at random from the tested group. What is the probability that their test result is accurate, to the nearest per cent?

	Test results		
	<i>Test indicated flu</i>	<i>Test did not indicate flu</i>	<i>Total</i>
<i>People with flu</i>	72	3	75
<i>People without flu</i>	16	256	272
	88	259	347

18 2004 HSC Standard 2 Band 5

Lie detector tests are not always accurate. A lie detector test was administered to 200 people. The results were:

- 50 people lied. Of these, the test indicated that 40 had lied;
- 150 people did NOT lie. Of these, the test indicated that 20 had lied.

a Complete the table.

	<i>Test indicated a lie</i>	<i>Test did not indicate a lie</i>	<i>Total</i>
People who lied			50
People who did NOT lie			150

- b** For how many of the people tested was the lie detector test accurate?
- c** For what percentage of the people tested was the test accurate?
- d** What is the probability that the test indicated a lie for a person who did NOT lie?

19 2016 HSC Standard 2 Band 6

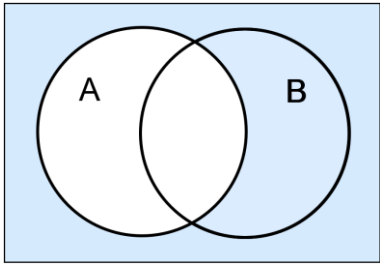
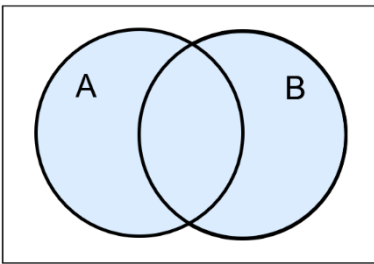
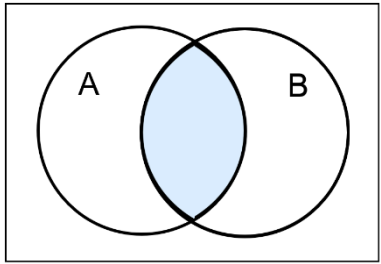
A group of 485 people was surveyed. The people were asked whether or not they smoke. The results are recorded in the table.

	<i>Smokers</i>	<i>Non-smokers</i>	<i>Total</i>
Male	88	176	264
Female	68	153	221
	156	329	485

A person is selected at random from the group. What is the approximate probability that the person selected is a smoker OR is male?

SET NOTATION WITH VENN DIAGRAMS

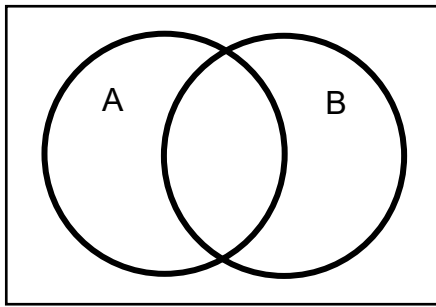
- A **set** is a collection of distinct objects.
For example, the set of the first 5 positive integers is: $S = \{1,2,3,4,5\}$.
- **Set notation** is a way to communicate efficiently.
“the probability that a randomly chosen person likes both apples and bananas” $\rightarrow P(A \cap B)$.

Not A	A or B, or both.	A and B
$\bar{A}$ or A' or A^c “A complement” Consider everything except A  $P(\bar{A}) = 1 - P(A)$	$A \cup B$ “A union B” Consider all regions. 	$A \cap B$ “A intersection B” Consider overlapping region. 

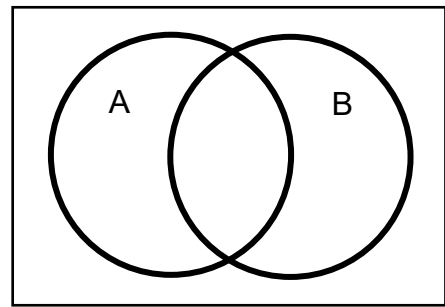
Example Identify compound events with Venn Diagrams.

Shade the area on the Venn diagram that represents the statement.

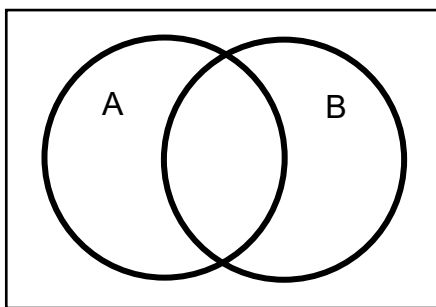
A



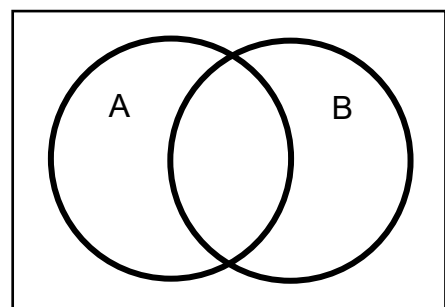
B



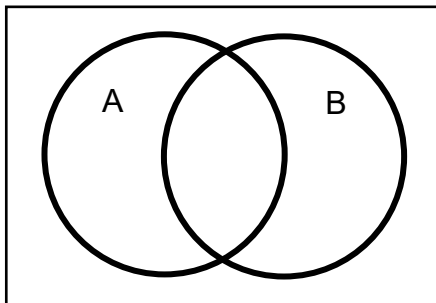
$A \cap B$



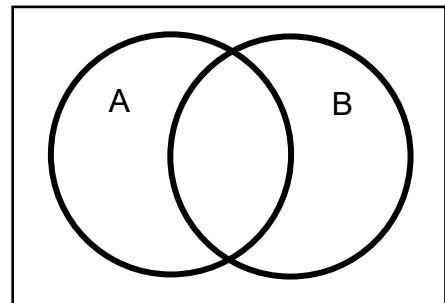
$A \cup B$



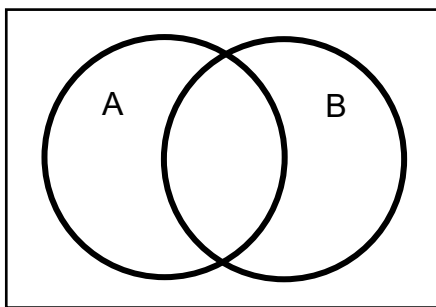
$\bar{A}$



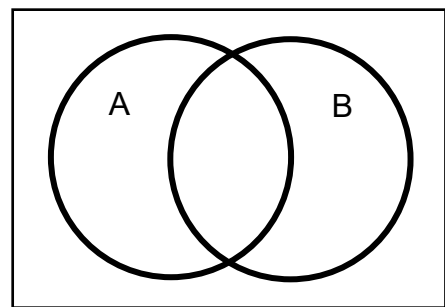
$\bar{B}$



$\bar{A} \cap \bar{B}$

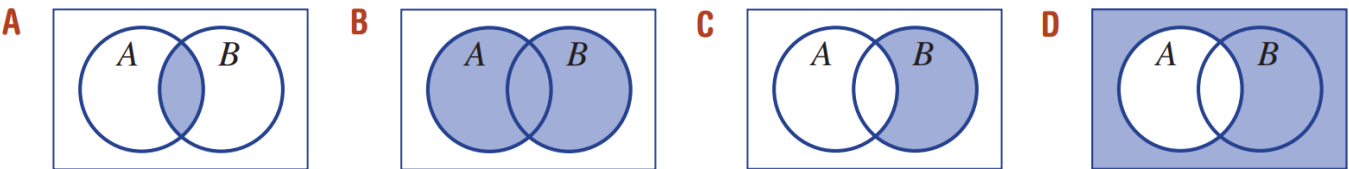


$\bar{A} \cap B$

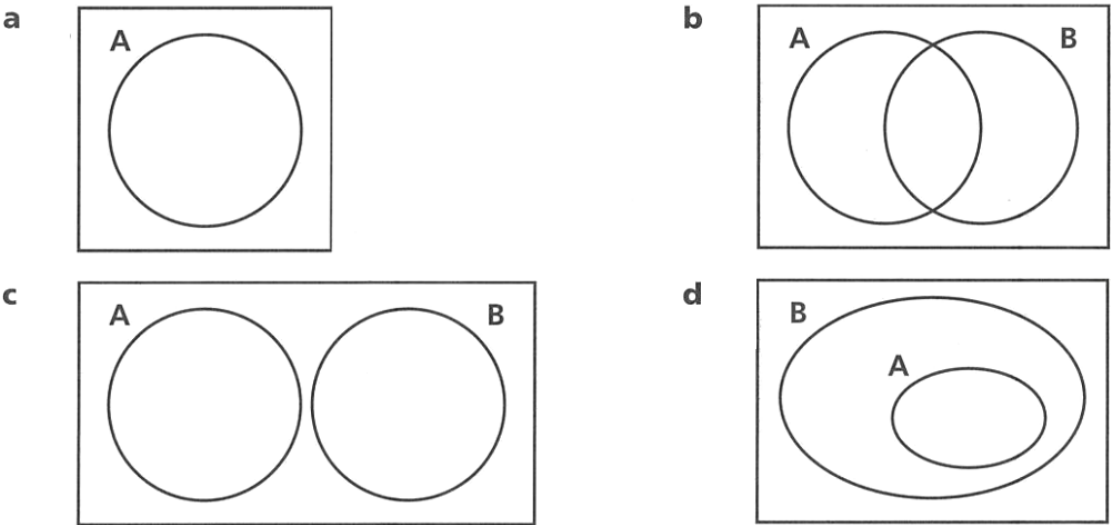


1 Match the diagram to the set.

- a $A \cup B$
- b $\bar{A}$
- c $A \cap B$
- d $\bar{A} \cap B$

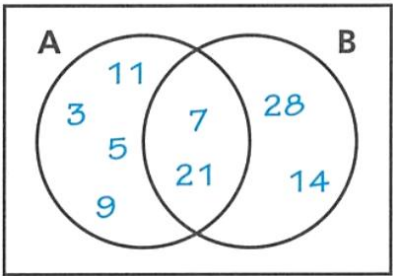


2 On each diagram, shade the region A'.



3 Here are two sets, A and B

- a Write down the elements of A'
.....
- b Write down the elements of B'
.....



4 Consider these three sets.

$\xi = \{e, g, h, m, n, p, s, t\}$

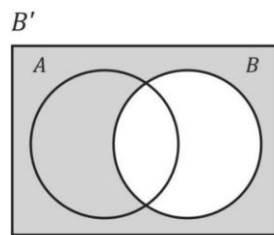
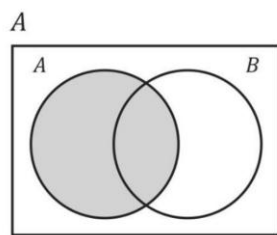
$A = \{h, p, s, t\}$

$B = \{e, g, h, m, p, t\}$

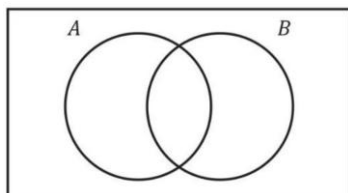
Write down the elements of each of these sets.

- a A'
- b B'
- c $A \cap B$
- d $A \cup B$
- e $(A \cap B)'$
- f $(A \cup B)'$

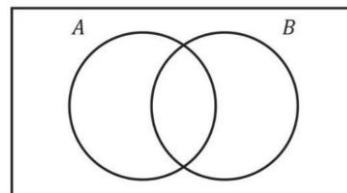
5 The two Venn diagrams show A and B' .



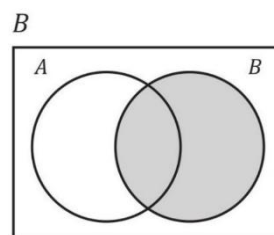
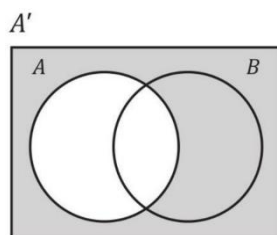
a Shade $A \cup B'$ by shading everything that is either in the first picture or in the second picture.



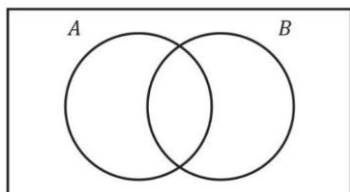
b Shade $A \cap B'$ by shading anything that is in both the first and second picture



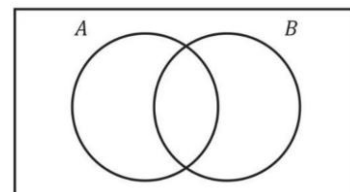
6 The two Venn diagrams show A' and B .



a Shade $A' \cup B$

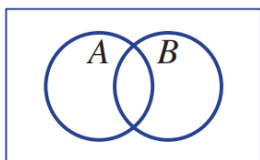


b Shade $A' \cap B$

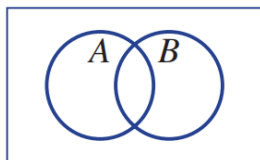


7 Shade the Venn diagrams with the set.

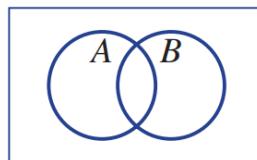
a A



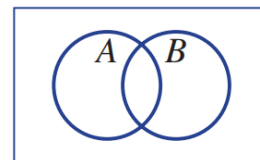
b B



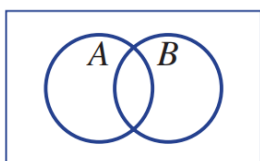
c $A \cap B$



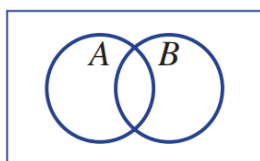
d $A \cup B$



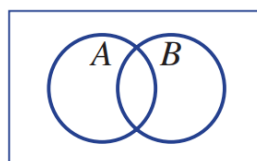
e $A \cap \bar{B}$



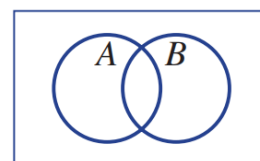
f $\bar{A} \cap B$



g $\bar{A}$



h $\bar{A} \cap \bar{B}$



8 Find $A \cup B$ and $A \cap B$ for these sets.

a $A = \{1, 3, 5\}$

$B = \{3, 5, 7\}$

$A \cup B = \dots\dots\dots$

$A \cap B = \dots\dots\dots$

b $A = \{1, 3, 4, 8, 9\}$

$B = \{2, 4, 5, 6, 9, 10\}$

$A \cup B = \dots\dots\dots$

$A \cap B = \dots\dots\dots$

c $A = \{h, o, b, a, r, t\}$

$B = \{b, i, c, h, e, n, o\}$

$A \cup B = \dots\dots\dots$

$A \cap B = \dots\dots\dots$

9 Two sets are mutually exclusive when they do not share any elements. Decide whether these sets are mutually exclusive.

a $A = \{1, 3, 5, 7\}$

$B = \{5, 8, 11, 14\}$

$\dots\dots\dots$

b $A = \{-3, -2, \dots, 4\}$

$B = \{-11, -10, \dots, -4\}$

$\dots\dots\dots$

c $A = \{\text{prime numbers}\}$

$B = \{\text{even numbers}\}$

$\dots\dots\dots$

10 Draw what two mutually exclusive sets would look like using a Venn Diagram.



11 Decide which of the elements would need to be removed from event A if the two events A and B described below are to become mutually exclusive.

a $A = \{1, 2, 3, 4\}$

$B = \{4, 5, 6, 7\}$

b $A = \{10, 12, 14, 16, 18\}$

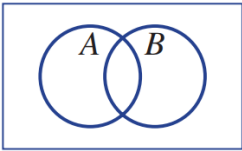
$B = \{9, 10, 11, 12\}$

c $A = \{a, b, c, d, e\}$

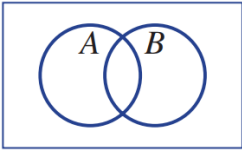
$B = \{a, c, e, g\}$

12

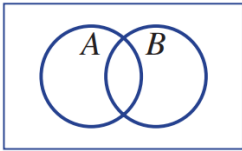
a Shade $A \cup B$



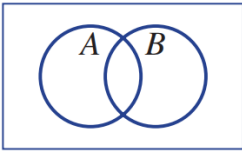
Hence shade $\overline{A \cup B}$



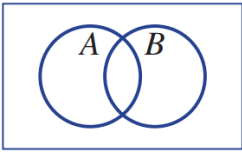
b Shade $\bar{A}$



Shade $\bar{B}$



Shade $\bar{A} \cup \bar{B}$

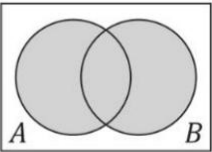


c Hence what can you conclude about $\overline{A \cup B}$ and $\bar{A} \cup \bar{B}$?

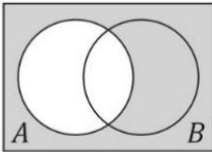
.....

13 Identify the following regions:

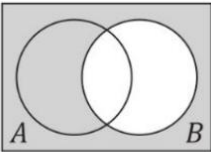
a



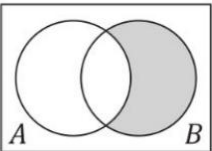
d



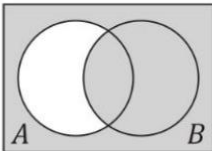
g



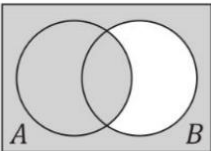
b



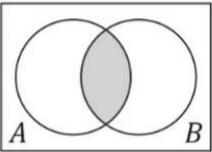
e



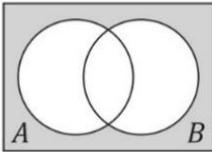
h



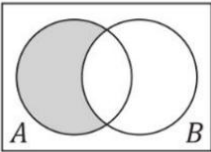
c



f

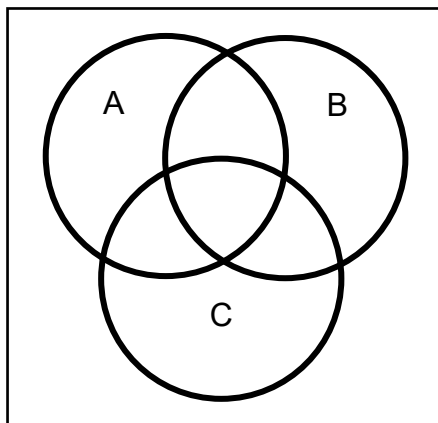


i

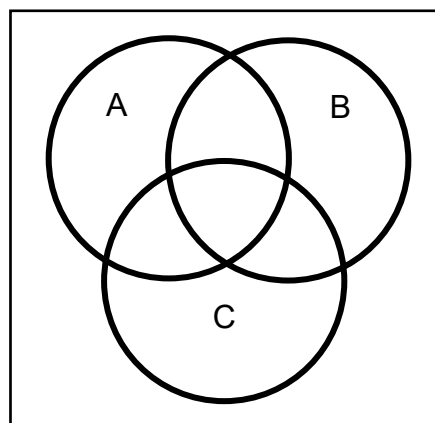


14

a Shade the region $(A \cap B) \cup C$



b Shade the region $A \cap (B \cup C)$



15 Write down the elements of:

a $X \cap Y$

c $(X \cap Y) \cap Z$

e $X' \cup Y'$

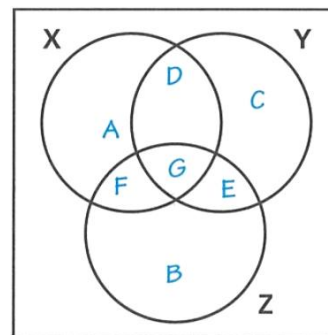
g $(X \cup Y)'$

b $Y \cap Z$

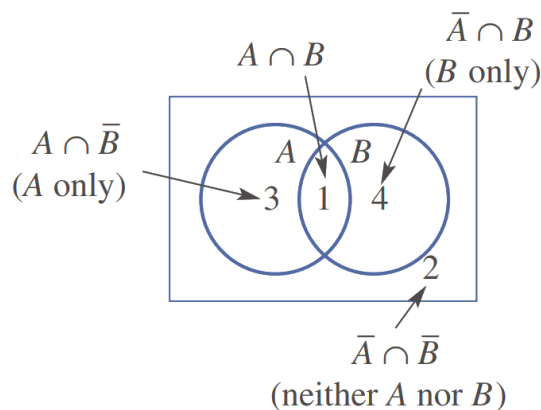
d Y'

f $X \cup Y'$

h $(X \cup Y) \cap Z'$

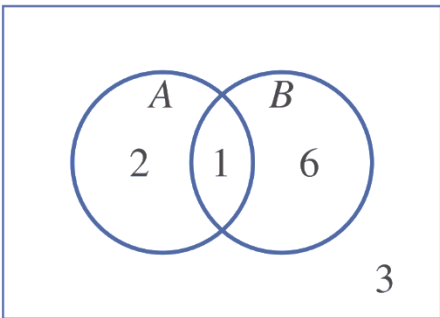


PROBABILITY OF EVENTS USING SET NOTATION



Example Use set notation.

Find the probability of:



$$P(A \cap B) = \frac{1}{12}$$

$$P(A \cup B) = \frac{9}{12} = \frac{3}{4}$$

$$P(\bar{B}) = \frac{5}{12}$$

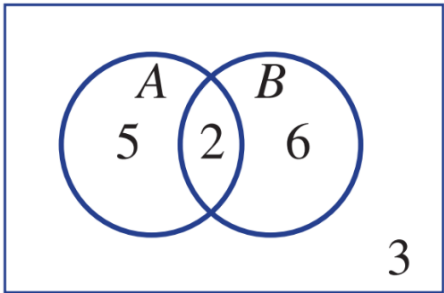
$$P(A \cap \bar{B}) = \frac{2}{12} = \frac{1}{6}$$

Write these statements in English:

$P(A \cap B)$
 $P(A \cup B)$
 $P(\bar{B})$
 $P(A \cap \bar{B})$

The Venn diagram shows the distribution of elements in two sets, A and B.

Find:



$P(A \cap B) =$

1/8

$P(\bar{A}) =$

9/16

$P(A \cap \bar{B}) =$

5/16

$P(\bar{A} \cap B) =$

3/8

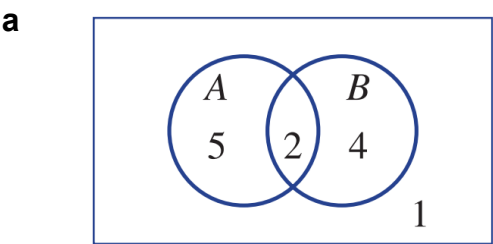
$P(\bar{A} \cap \bar{B}) =$

3/16

$P(A \cup B) =$

13/16

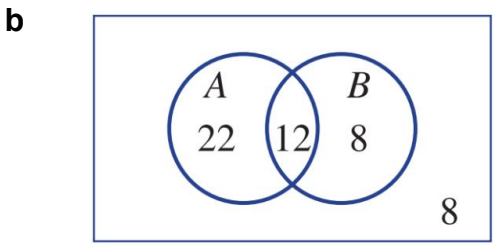
1 For each diagram, find the probabilities.



$P(A) =$ $P(B) =$

$P(A \cap B) =$ $P(A \cup B) =$

$P(\bar{A}) =$ $P(\bar{A} \cap B) =$



$P(A) =$ $P(B) =$

$P(A \cap B) =$ $P(A \cup B) =$

$P(\bar{A}) =$ $P(\bar{A} \cap B) =$

2 From a group of 50 adults, 35 enjoy reading fiction (F), 20 enjoy reading non-fiction (N) and 10 enjoy reading both fiction and non-fiction.

a Illustrate the information in a Venn diagram.

b How many people enjoy:

i Fiction only?

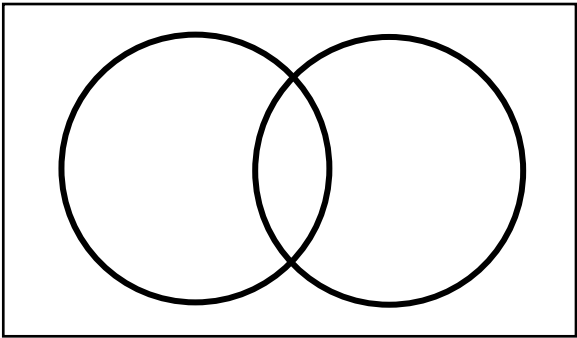
ii Neither fiction nor non-fiction?

c Find the probability that a person chosen randomly will enjoy reading:

i Non-fiction.

ii Non-fiction only.

iii Both fiction and non-fiction.



3 At a show, 45 children have the choice of riding on the Ferris wheel (F) and/or the Big Dipper (B). Thirty-five of the children wish to ride on the Ferris wheel, 15 children want to ride on the Big Dipper and 10 children want to ride on both.

a Illustrate the information in a Venn diagram.

b How many people are in the set:

i F

ii $\bar{F} \cap \bar{B}$

c Find:

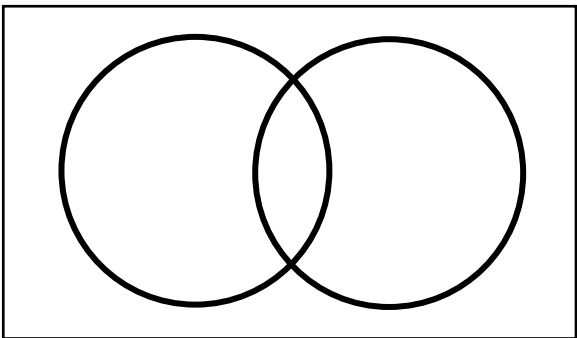
i $P(F)$

ii $P(F \cap B)$

iii $P(F \cup B)$

iv $P(\bar{F})$

v $P(\bar{F} \cap \bar{B})$



- 4 From a total of 10 people, 5 like apples (A), 6 like bananas (B) and 4 like both apples and bananas.

a Illustrate the information in a Venn diagram.

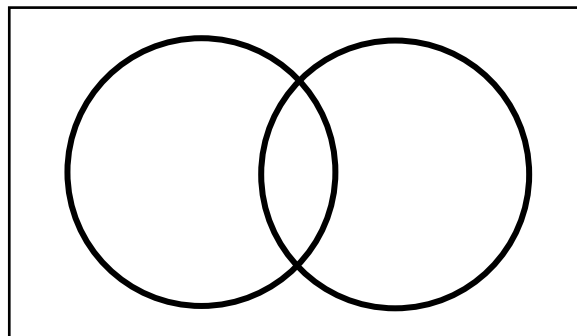
b Find:

i $P(\bar{A} \cap B)$

ii $P(\bar{A} \cap \bar{B})$

iii $P(A \cap B)$

iv $P(A \cup B)$



- 5 Consider the sample space $\{1, 2, 3, 4, 5, 6\}$ and the sets $A = \{1, 4, 7\}$ and $B = \{2, 3, 5\}$. Find:

a $P(B)$

b $P(\bar{B})$

c $P(A \cap B)$

- 6 A number is chosen from the set of positive integers between 1 and 20 inclusive. A is the set of multiples of 3 less than 20, and B is the set of factors of 15.

List the sets:

a $A \cap B$

b $A \cup B$

c $\bar{A}$

d $A \cap \bar{B}$

Find the probabilities:

a $P(A \cap B)$

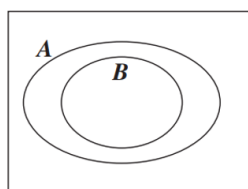
b $P(A \cup B)$

c $P(\bar{A})$

d $P(A \cap \bar{B})$

7

a $P(A) = \frac{1}{2}$ $P(B) = \frac{1}{3}$



Find:

i $P(\bar{A})$

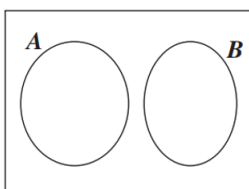
ii $P(\bar{B})$

iii $P(A \cap B)$

iv $P(A \cup B)$

v $P(\overline{A \cup B})$

b $P(A) = \frac{2}{5}$ $P(B) = \frac{1}{5}$



Find:

i $P(\bar{A})$

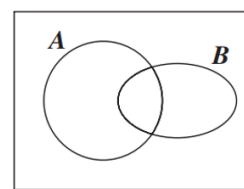
ii $P(\bar{B})$

iii $P(A \cap B)$

iv $P(A \cup B)$

v $P(\overline{A \cup B})$

c $P(A) = \frac{1}{2}$ $P(B) = \frac{1}{3}$
 $P(A \cap B) = \frac{1}{6}$



Find:

i $P(\bar{A})$

ii $P(\bar{B})$

iii $P(A \cup B)$

iv $P(\overline{A \cup B})$

v $P(\overline{A \cap B})$