Solutions by
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GCSE (9-1) Grade 7 Venn Diagrams Conditional Probability

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
- there may be more space than you need.

Show all your working out

Information

The total mark for this paper is 46.
The marks for **each** question are shown in brackets.
Use this as a guide as to how much time to spend on each question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

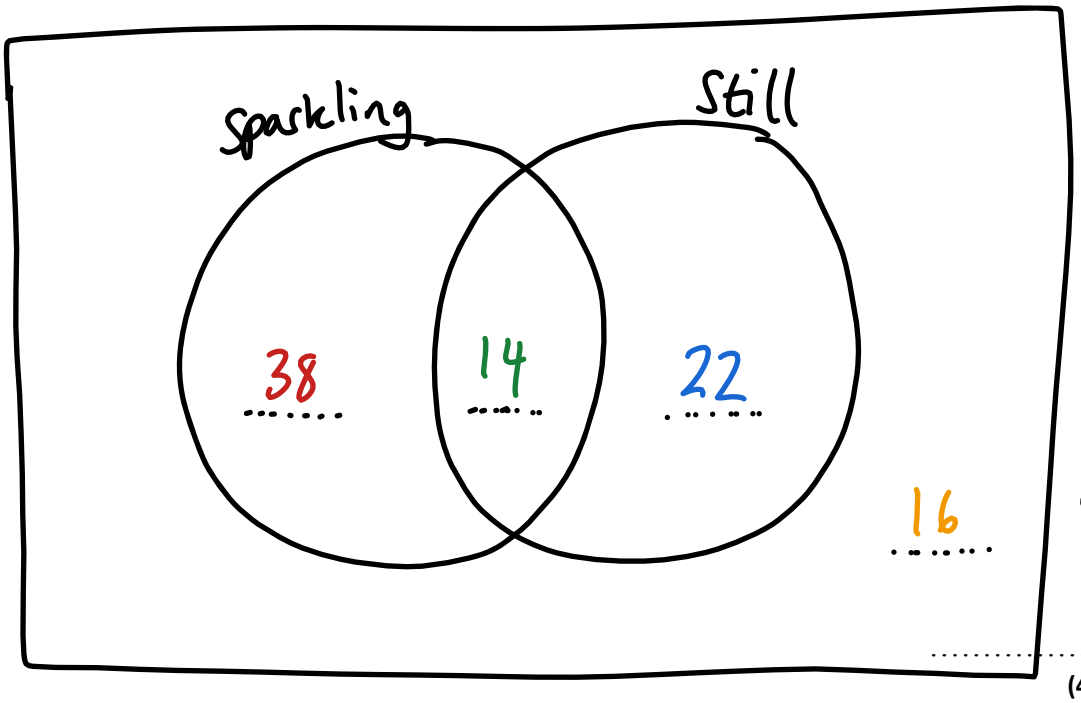
Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1. 90 children were asked what type of bottled water they took to school.
Their replies are as follows:

52 took sparkling water
36 took still water
14 took both types of water

52 - 14 = 38
36 - 14 = 22

(a) Show this information on a Venn diagram



38
14
22
74

90 - 74 = 16

.....

(4 marks)

(b) Given that a child takes sparkling water, find the probability that this child also takes still water.

14
52

.....

(2 marks)

(c) Given that a child takes still water, find the probability that this child also takes sparkling water.

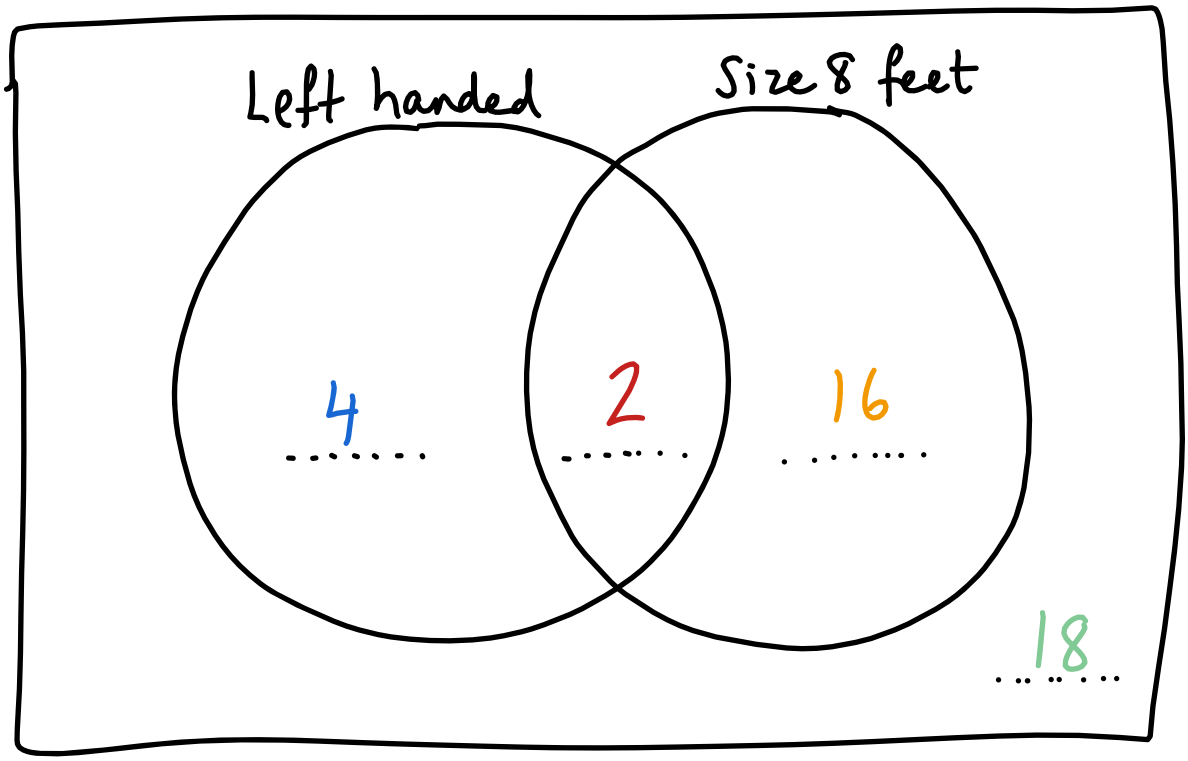
14
36

.....

(2 marks)

2. In a group of 40 students 6 are left-handed, 18 have size 8 feet and 2 are left-handed with size 8 feet.

(a) Find the probability that a student is left-handed or has size 8 feet,



$18 - 2 = 16$

$6 - 2 = 4$

$40 - 22 = 18$

22 / 40

$4 + 2 + 16 = 22$

(4 marks)

(b) Given that the student is left-handed, find the probability that a student has size 8 feet.

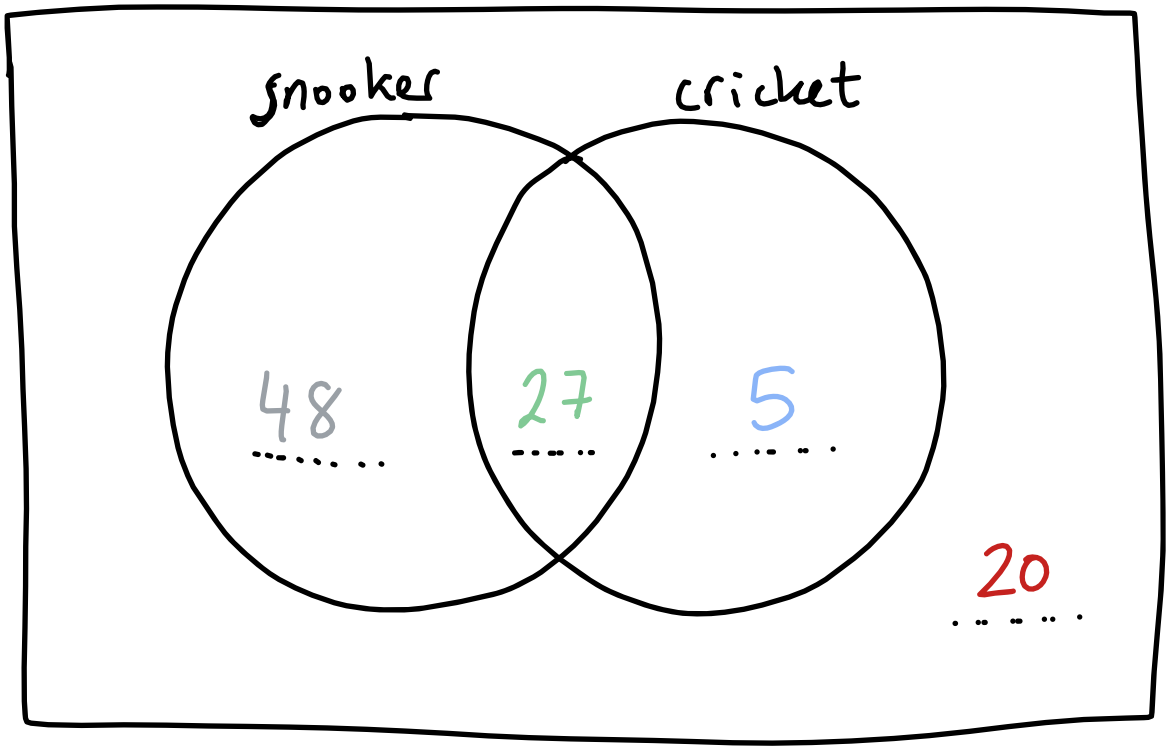
2 / 6

(2 marks)

3. In a survey 100 people were asked whether they watched snooker or cricket when it was on TV. 20 watched neither, 75 watched snooker, 32 watched cricket.

A person is selected at random.

(a) Find the probability that this person watched both cricket and snooker.



$100 - 20 = 80$

$75 + 32 = 107$

$107 - 80 = 27$

$75 - 27 = 48$

$32 - 27 = 5$

$\frac{80}{100}$

(4 marks)

(b) Given that this person watched snooker, work out the probability that this person watched cricket.

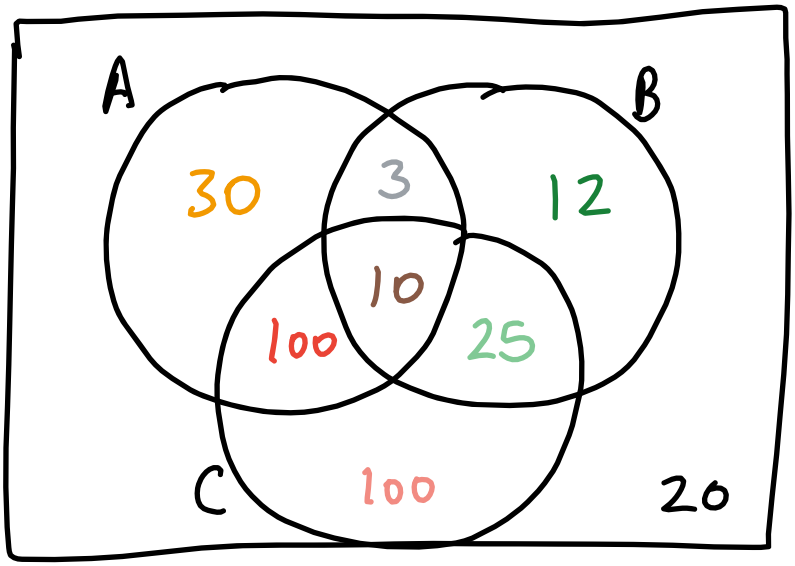
$\frac{27}{75}$

(2 marks)

4. A person's blood group is determined by whether or not it contains any of 3 substances *A*, *B* and *C*. A doctor surveyed 300 patients' blood and produced the table below.

Blood contains	Number of patients
Only *C*	100
A and *C* but not *B*	100
Only *A*	30
B and *C* but not *A*	25
Only *B*	12
A, *B* and *C*	10
A and *B* but not *C*	3

(a) Draw a Venn diagram to show this information.



.....

(3 marks)

(b) Find the probability that a randomly chosen patient's blood contains substance *C*.

$100 + 10 + 25 + 100 = 235$

$\frac{235}{300}$

.....

(1 mark)

Harry is one of the patients.

(c) Given that his blood contains substance *A*, find the probability that his blood contains all 3 substances.

$30 + 100 + 10 + 3 = 143$

$\frac{10}{143}$

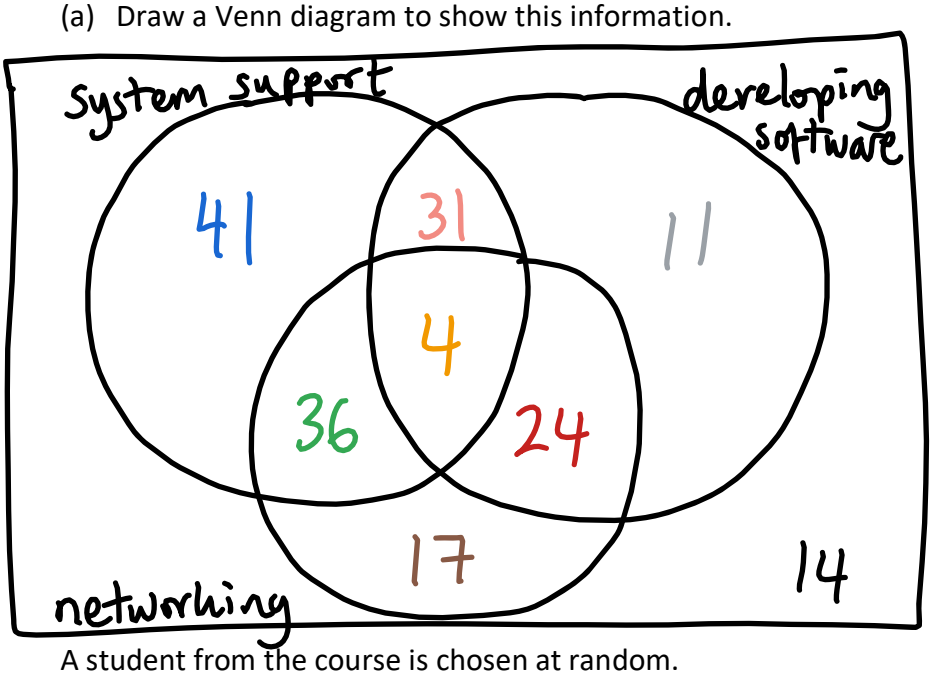
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(2 marks)

5. There are 180 students at a college following a general course in computing.
Students on this course can choose to take up to three extra options.

112 take systems support
70 take developing software
81 take networking
35 take developing software and systems support
28 take networking and developing software
40 take systems support and networking
4 take all three extra options

(a) Draw a Venn diagram to show this information.



.....
(3 marks)

A student from the course is chosen at random.

(b) Find the probability that this student takes

(i) none of the three extra options,

14/180 .....**(1)**

(ii) networking only.

17/180 .....**(1)**

Students who want to become technicians take systems support and networking.

(c) Given that a randomly chosen student wants to become a technician, find the probability that this student takes all three extra options.

41 + 31 + 4 + 36 + 17 + 24 = 155

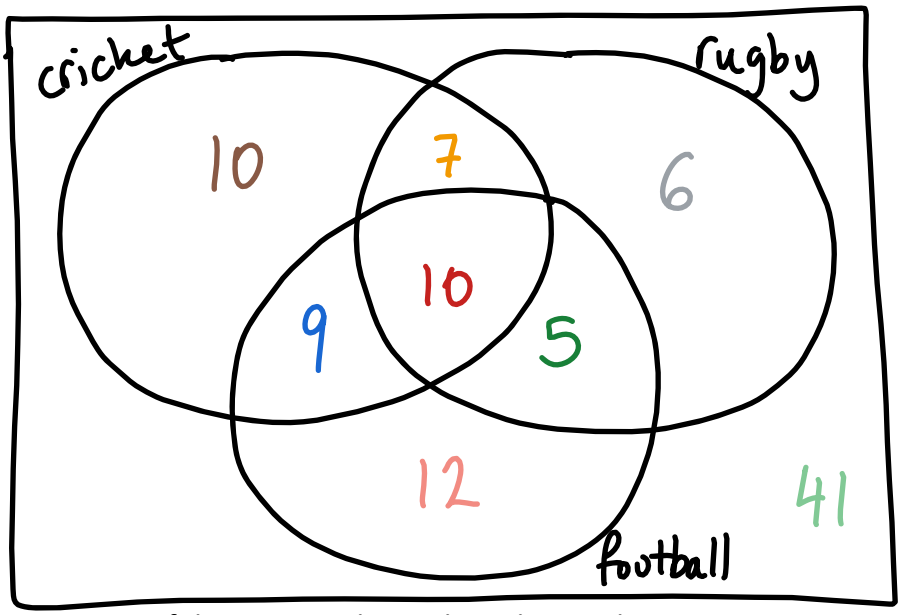
4/155

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(3 marks)

6. 100 people were asked which sports they watched on television.
Here are the results.

36 people watched cricket
28 people watched rugby
36 people watched football
17 people watched both cricket and rugby
19 people watched both cricket and football
15 people watched both rugby and football
10 people watched all three sports

(a) Draw a Venn diagram to show this information.



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(3 marks)

One of the 100 people is selected at random.

(b) Given that a person watches cricket, find the probability that this person also watches football.

$9 + 10 = 19$

$\frac{19}{36}$

.....
(2 marks)

(c) Given that a person watches at least one of the sports, find the probability that this person watches all three.

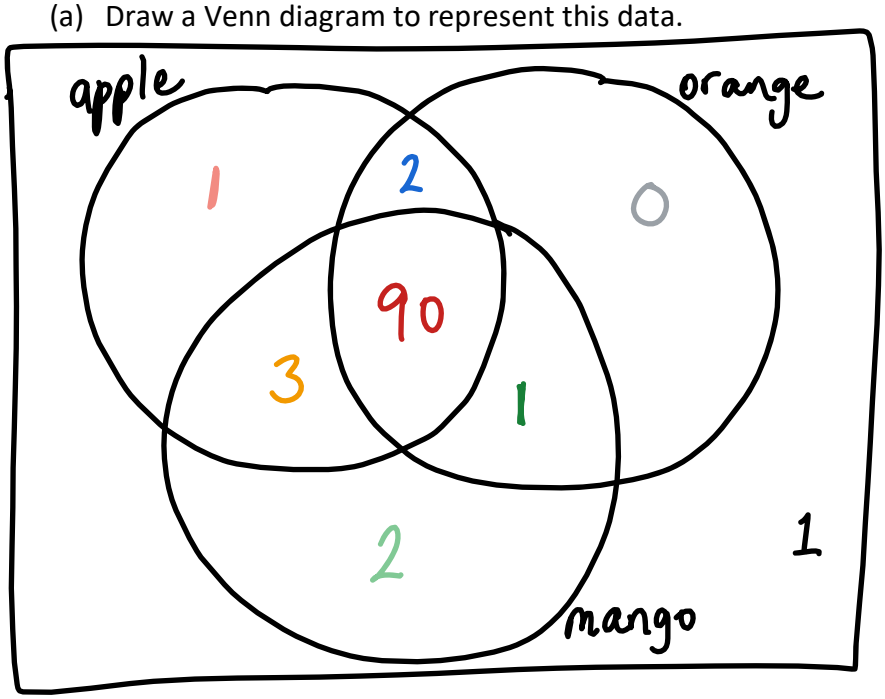
$\frac{10}{59}$

.....
(2 marks)

7. The following shows the results of a juice tasting survey of 100 people.

96 like apple juice
93 like orange juice
96 like mango juice
92 like apple juice and orange juice
91 like orange juice and mango juice
93 like apple juice and mango juice
90 like all three

(a) Draw a Venn diagram to represent this data.



.....
(3 marks)

(b) Find the probability that a randomly selected person from the survey likes

(i) none of the three juices, $\frac{1}{100}$ .....**(1)**

(ii) apple juice but not orange juice. $\frac{4}{96}$ .....**(1)**

(c) Given that a person from the survey likes apple juice, find the probability that the person likes mango juice.

$\frac{93}{96}$

.....
(2 marks)

TOTAL FOR PAPER: 46 MARKS