

Probability Venn Diagrams

Patrons are reminded to *define their variables*; i.e. if you introduce an x somewhere then you must define what it is (for example “Let x be the number of students in school who don’t define their variables”).

- 100 people are surveyed as to whether they enjoy rugby or football.
70 like football.
60 like rugby.
45 like both.
 - Draw a Venn diagram of the situation.
A person from the survey is selected at random.
 - Find the probability they like neither rugby nor football. $\frac{3}{20}$
 - Find the probability they like only one of the two sports. $\frac{5}{10}$
- Fifty people are surveyed as to whether they read the Guardian or the Telegraph. Forty read the Telegraph. Thirty read the Guardian. Five read neither.
 - Draw a Venn diagram of the situation.
 - Find the number of people who read both the Guardian and the Telegraph. 25
A person from the survey is selected at random.
 - Find the probability they read the Telegraph but not the Guardian. $\frac{3}{10}$
 - Find the probability they read only one paper. $\frac{2}{5}$
- Sixty A level students are surveyed as to whether they study maths or history. Fifty study maths. Twenty study history. Seven read neither.
 - Draw a Venn diagram of the situation.
 - Find the number of students who study both maths and history. 17
A student from the survey is selected at random.
 - Find the probability they read history but not maths. $\frac{1}{20}$
 - Find the probability they read neither subject. $\frac{7}{60}$
- A college has 80 students in Year 12.
20 students study Biology.
28 students study Chemistry.
30 students study Physics.
7 students study both Biology and Chemistry.
11 students study both Chemistry and Physics.
5 students study both Physics and Biology.
3 students study all 3 of these subjects.
 - Draw a Venn diagram to represent this information.
A Year 12 student at the college is selected at random.
 - Find the probability that the student studies Chemistry but not Biology or Physics.
 - Find the probability that the student studies Chemistry or Physics or both.

5. A group of 100 students are asked if they like folk music, rock music or soul music.
 All students who like folk music also like rock music.
 No students like both rock music and soul music.
 75 students do not like soul music.
 12 students who like rock music do not like folk music.
 30 students like folk music.
- (a) Draw a Venn diagram to illustrate this information.
 (b) State two of these types of music that are mutually exclusive.
- Find the probability that a randomly chosen student
- (c) does not like folk music, rock music or soul music,
 (d) likes rock music,
 (e) likes folk music or soul music.
6. The following shows the results of a survey on the types of exercise taken by a group of 100 people.
 65 run
 48 swim
 60 cycle
 40 run and swim
 30 swim and cycle
 35 run and cycle
 25 do all three
- (a) Draw a Venn Diagram to represent these data.
 Find the probability that a randomly selected person from the survey
- (b) takes none of these types of exercise,
 (c) swims but does not run,
 (d) takes at least two of these types of exercise.
7. 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 represent this information.
 A student from the course is chosen at random. Find the probability that the student takes
- (b) none of the three extra options,
 (c) networking only.

8. 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	No. 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 represent this information.
- (b) Find the probability that a randomly chosen patient's blood contains substance C.
- Patients whose blood contains none of these substances are called universal blood donors.
- (c) Find the probability that a randomly chosen patient is a universal blood donor.