

SL Probability Review

Name: _____ Date: _____ Block: _____

1. The letters of the word PROBABILITY are written on 11 cards as shown below.



Two cards are drawn at random without replacement.
 Let A be the event the first card drawn is the letter A.
 Let B be the event the second card drawn is the letter B.

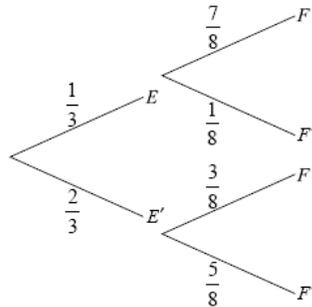
- (a) Find $P(A)$. (1)
 - (b) Find $P(B | A)$. (2)
 - (c) Find $P(A \cap B)$. (3)
- (Total 6 marks)**

2. José travels to school on a bus. On any day, the probability that José will miss the bus is $\frac{1}{3}$.

If he misses his bus, the probability that he will be late for school is $\frac{7}{8}$.

If he does not miss his bus, the probability that he will be late is $\frac{3}{8}$.

Let E be the event “he misses his bus” and F the event “he is late for school”.
 The information above is shown on the following tree diagram.



- (a) Find
 - (i) $P(E \cap F)$;
 - (ii) $P(F)$. (4)
- (b) Find the probability that
 - (i) José misses his bus and is not late for school;
 - (ii) José missed his bus, given that he is late for school. (5)

The cost for each day that José catches the bus is 3 euros. José goes to school on Monday and Tuesday.

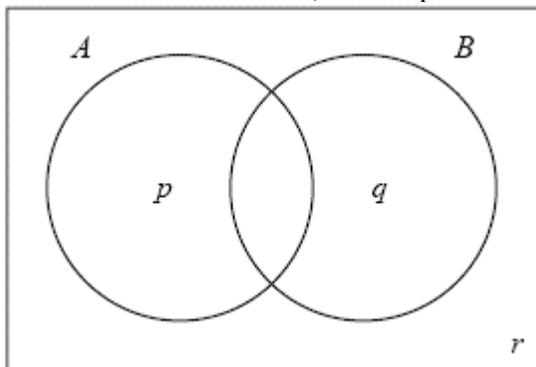
(c) **Copy** and complete the probability distribution table.

X (cost in euros)	0	3	6
P (X)	$\frac{1}{9}$		

- (d) Find the expected cost for José for both days. (3)
- (2)**
- (Total 14 marks)**

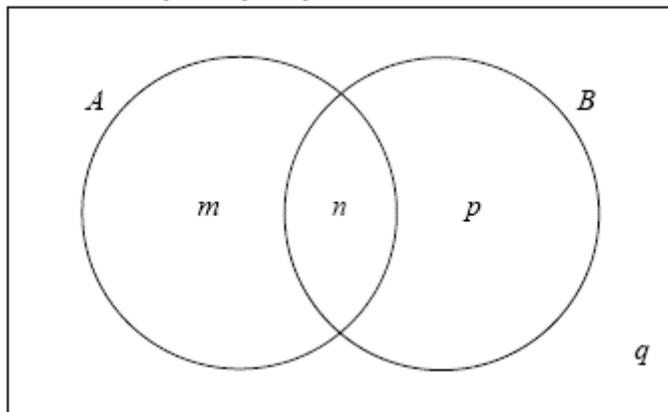
3. A multiple choice test consists of ten questions. Each question has five answers. Only one of the answers is correct. For each question, Jose randomly chooses one of the five answers.
- (a) Find the expected number of questions Jose answers correctly. (1)
 - (b) Find the probability that Jose answers exactly three questions correctly. (2)
 - (c) Find the probability that Jose answers more than three questions correctly. (3)
- (Total 6 marks)**

4. Consider the events A and B , where $P(A) = 0.5$, $P(B) = 0.7$ and $P(A \cap B) = 0.3$. The Venn diagram below shows the events A and B , and the probabilities p , q and r .



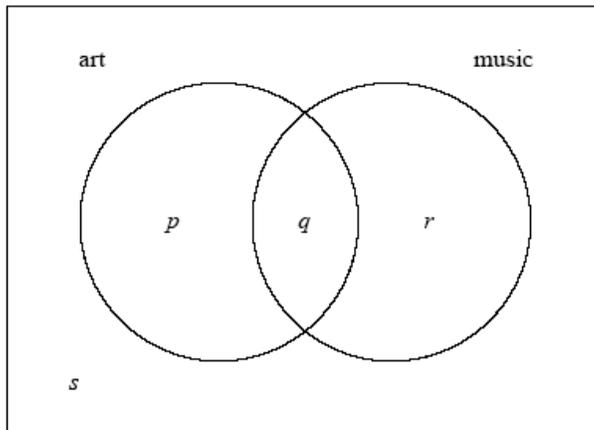
- (a) Write down the value of
 - (i) p ;
 - (ii) q ;
 - (iii) r .(3)
 - (b) Find the value of $P(A | B')$. (2)
 - (c) Hence, or otherwise, show that the events A and B are **not** independent. (1)
- (Total 6 marks)**

5. The Venn diagram below shows events A and B where $P(A) = 0.3$, $P(A \cup B) = 0.6$ and $P(A \cap B) = 0.1$. The values m , n , p and q are probabilities.



- (a)
 - (i) Write down the value of n .
 - (ii) Find the value of m , of p , and of q .(4)
 - (b) Find $P(B')$. (2)
- (Total 6 marks)**

6. In a group of 16 students, 12 take art and 8 take music. One student takes neither art nor music. The Venn diagram below shows the events art and music. The values p , q , r and s represent numbers of students.



- (a) (i) Write down the value of s .
 (ii) Find the value of q .
 (iii) Write down the value of p and of r . (5)
- (b) (i) A student is selected at random. Given that the student takes music, write down the probability the student takes art.
 (ii) **Hence**, show that taking music and taking art are **not** independent events. (4)
- (c) Two students are selected at random, one after the other. Find the probability that the first student takes **only** music and the second student takes **only** art. (4)
- (Total 13 marks)**

7. A company uses two machines, A and B, to make boxes. Machine A makes 60 % of the boxes.
 80 % of the boxes made by machine A pass inspection.
 90 % of the boxes made by machine B pass inspection.

A box is selected at random.

- (a) Find the probability that it passes inspection. (3)
- (b) The company would like the probability that a box passes inspection to be 0.87.
 Find the percentage of boxes that should be made by machine B to achieve this. (4)
- (Total 7 marks)**

8. In a class of 100 boys, 55 boys play football and 75 boys play rugby. Each boy must play at least one sport from football and rugby.

- (a) (i) Find the number of boys who play both sports.
 (ii) Write down the number of boys who play only rugby. (3)
- (b) One boy is selected at random.
 (i) Find the probability that he plays only one sport.
 (ii) Given that the boy selected plays only one sport, find the probability that he plays rugby. (4)

Let A be the event that a boy plays football and B be the event that a boy plays rugby.

- (c) Explain why A and B are **not** mutually exclusive. (2)
- (d) Show that A and B are **not** independent. (3)

(Total 12 marks)

9. Consider the independent events A and B . Given that $P(B) = 2P(A)$, and $P(A \cup B) = 0.52$, find $P(B)$.

(Total 7 marks)

10. Jan plays a game where she tosses two fair six-sided dice. She wins a prize if the sum of her scores is 5.

(a) Jan tosses the two dice once. Find the probability that she wins a prize.

(3)

(b) Jan tosses the two dice 8 times. Find the probability that she wins 3 prizes.

(2)**(Total 5 marks)**