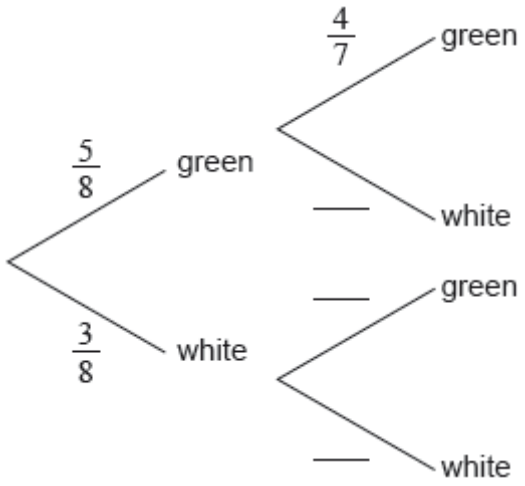
BECA / Huson / 11.1 IB Math SL Name:

6-15 Test Probability Introduction

1a. A bag contains 5 green balls and 3 white balls. Two balls are selected at random without replacement.

Complete the following tree diagram. *[3 marks]*



1b. Find the probability that exactly one of the selected balls is green. *[3 marks]*

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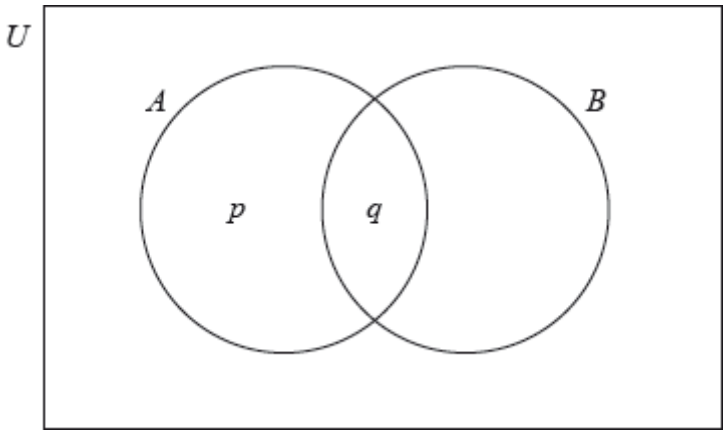
2a. The following Venn diagram shows the events A and B, where $\mathrm{P}(A) = 0.4,\ \mathrm{P}(A \cup B) = 0.8$ and $\mathrm{P}(A \cap B) = 0.1$. The values p and q are probabilities.



(i) Write down the value of q.

(ii) Find the value of p. *[3 marks]*

2b. Find $\mathrm{P}(B)$. *[3 marks]*

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3a. Two events A and B are such that $\mathrm{P}(A) = 0.2$ and $\mathrm{P}(A \cup B) = 0.5$.

Given that A and B are mutually exclusive, find $\mathrm{P}(B)$. *[2 marks]*

3b. Alternatively, assuming that A and B are independent, find $\mathrm{P}(B)$. *[4 marks]*

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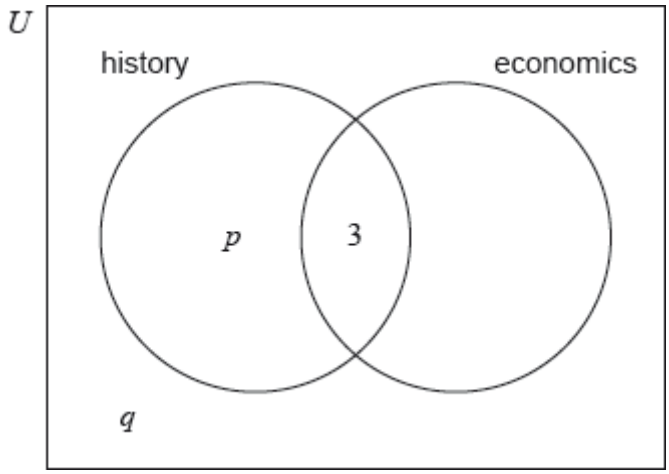
4a. In a group of 20 girls, 13 take history and 8 take economics. Three girls take both history and economics, as shown in the following Venn diagram. The values p and q represent numbers of girls.



Find the value of p; *[2 marks]*

4b. Find the value of q. *[2 marks]*

4c. A girl is selected at random. Find the probability that she takes economics but not history. *[2 marks]*

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5a. A box contains six red marbles and two blue marbles. Anna selects a marble from the box. She replaces the marble and then selects a second marble.

Write down the probability that the first marble Anna selects is red. *[1 mark]*

5b. Find the probability that Anna selects two red marbles. *[2 marks]*

5c. Find the probability that one marble is red and one marble is blue. *[3 marks]*

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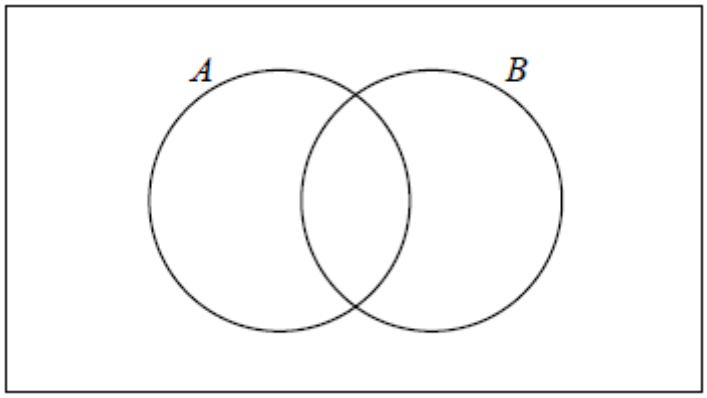
6a. Let A and B be independent events, where $\mathrm{P}(A) = 0.3$ and $\mathrm{P}(B) = 0.6$.

Find $\mathrm{P}(A \cap B)$. *[2 marks]*

6b. Find $\mathrm{P}(A \cup B)$. *[2 marks]*

6c. On the following Venn diagram, shade the region that represents $A \cap B'$.



[1 mark]

6d. Find $\mathrm{P}(A \cap B')$. *[2 marks]*

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7a. Events A and B are independent with $\mathrm{P}(A \cap B) = 0.2$ and $\mathrm{P}(A' \cap B) = 0.6$.

Find $\mathrm{P}(B)$. *[2 marks]*

7b. Find $\mathrm{P}(A \cup B)$. *[4 marks]*

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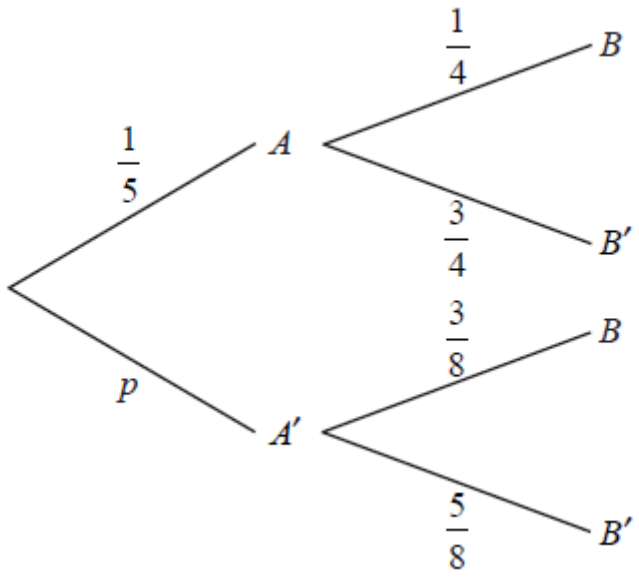
8a. The diagram below shows the probabilities for events A and B, with $\mathrm{P}(A') = p$.



Write down the value of p. *[1 mark]*

8b. Find $\mathrm{P}(B)$. *[3 marks]*

8c. Find $\mathrm{P}(A'|B)$. *[3 marks]*

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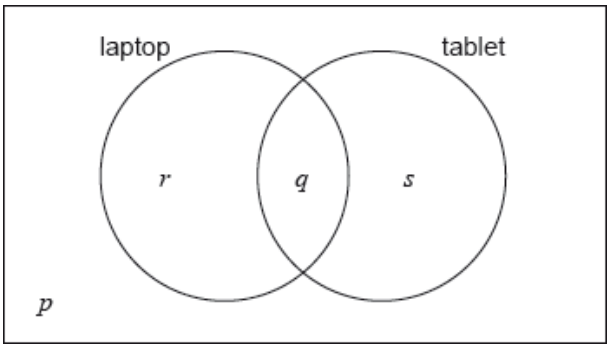
9a. In a class of 21 students, 12 own a laptop, 10 own a tablet, and 3 own neither.

The following Venn diagram shows the events "own a laptop" and "own a tablet".

The values p, q, r and s represent numbers of students.



(i) Write down the value of p.

(ii) Find the value of q.

(iii) Write down the value of r and of s. *[5 marks]*

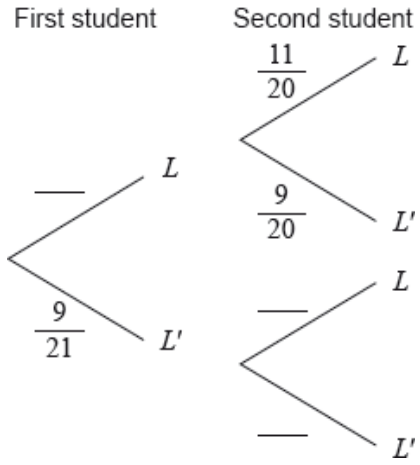
9b. A student is selected at random from the class.

(i) Write down the probability that this student owns a laptop.

(ii) Find the probability that this student owns a laptop or a tablet but not both. *[4 marks]*

9c. Two students are randomly selected from the class. Let L be the event a "student owns a laptop".

(i) **Copy** and complete the following tree diagram. (Do **not** write on this page.)



(ii) Write down the probability that the second student owns a laptop given that the first owns a laptop. *[4 marks]*

10. Celeste wishes to hire a taxicab from a company which has a large number of taxicabs.

The taxicabs are randomly assigned by the company.

The probability that a taxicab is yellow is 0.4.

The probability that a taxicab is a Fiat is 0.3.

The probability that a taxicab is yellow or a Fiat is 0.6.

Find the probability that the taxicab hired by Celeste is **not** a yellow Fiat. *[6 marks]*