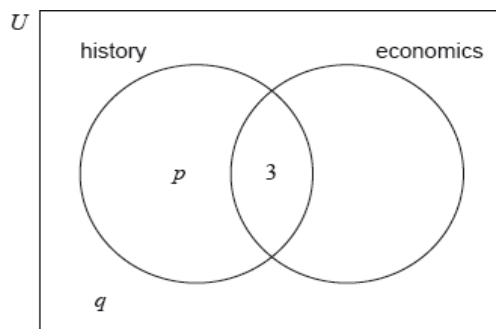**Pre-test:** Probability exam problems

1a. 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]*

1b. Find the value of **q**.   *[2 marks]*

1c. A girl is selected at random. Find the probability that she takes economics but not history.   *[2 marks]*

2a. Events A and B are independent with $P(A \cap B) = 0.2$ and $P(A' \cap B) = 0.6$.

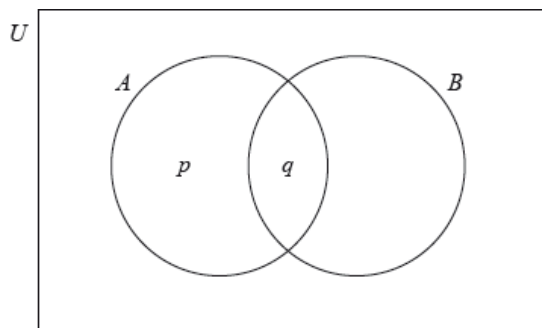   Find $P(B)$.   *[2 marks]*

2b. Find $P(A \cup B)$.   *[4 marks]*

3a. The following Venn diagram shows the events A and B, where $P(A) = 0.4, \; P(A \cup B) = 0.8$ and $P(A \cap B) = 0.1$. The values p and q are probabilities.

    (i) Write down the value of q.

    (ii) Find the value of p.   *[3 marks]*
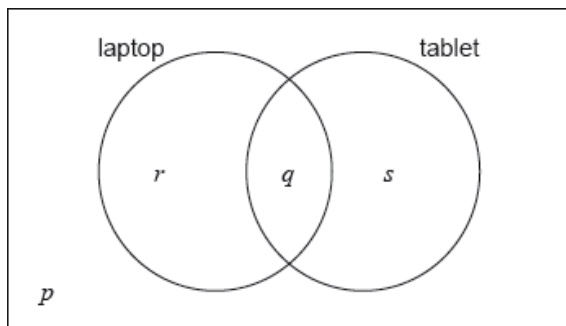
3b. Find $P(B)$.   *[3 marks]*

4a. 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]*

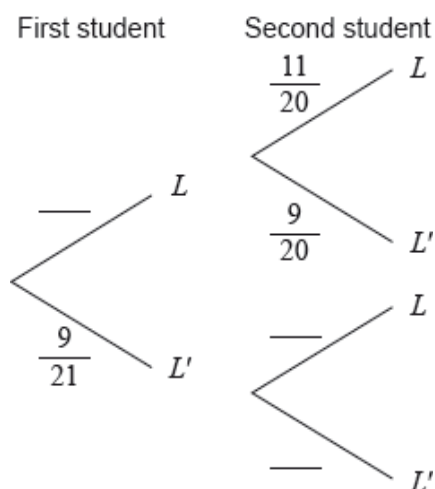**4b.** A student is selected at random from the class.

(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]*

4c. 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.