**Q1**

A teacher randomly selects one student from a group of 12 boys and 24 girls.
Find the probability that the teacher selects:

**a** a particular boy **b** a girl.

**Q2**

Using a tree diagram, find the probability that exactly one head is obtained when two fair coins are tossed.

**Q3**

Given that $P(A) = 0.4$, $P(B) = 0.7$ and that $P(A \cup B) = 0.8$, find:

**a** $P(A \cup B')$ **b** $P(A' \cap B)$

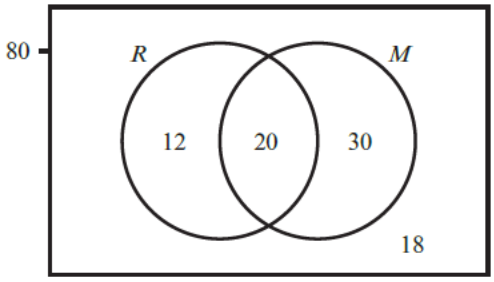
**Q4**

Events $J$, $K$ and $L$ are independent. Given that $P(J) = 0.5$, $P(K) = 0.6$ and $P(J \cap L) = 0.24$, find

**a** $P(J \cap K)$ **b** $P(L)$ **c** $P(K \cap L)$.

**Q5**

Each child in a group of 80 was asked whether they regularly read ($R$) or regularly watch a movie ($M$). The results are given in the Venn diagram opposite. One child is selected at random from the group. Event $R$ is 'a child who regularly reads is selected' and event $M$ is 'a child who regularly watches a movie is selected'.




Determine, with justification, whether events $R$ and $M$ are independent.

**Q6**

Abha passes through three independent sets of traffic lights when she drives to work. The probability that she has to stop at any particular set of lights is 0.2. Find the probability that Abha:

**a** first has to stop at the second set of lights

**b** has to stop at exactly one set of lights

**c** has to stop at any set of lights.

**Q7**

A child is selected at random from a group of 11 boys and nine girls, and one of the girls is called Rose. Find the probability that Rose is selected, given that a girl is selected.

**Q8**

Every Saturday, a man invites his sister to the theatre or to the cinema. 70% of his invitations are to the theatre and 90% of these are accepted. His sister rejects 40% of his invitations to the cinema.

Find the probability that the brother's invitation is accepted on any particular Saturday.

**Q9**

Maria chooses toast for her breakfast with probability 0.85. If she does not choose toast then she has a bread roll. If she chooses toast then the probability that she will have jam on it is 0.8. If she has a bread roll then the probability that she will have jam on it is 0.4.

**i** Draw a fully labelled tree diagram to show this information.

**ii** Given that Maria did **not** have jam for breakfast, find the probability that she had toast.

**Q10**

1% of a population have a certain disease and the remaining 99% are free from this disease. A test is used to detect this disease. This test is positive in 95% of the people with the disease and is also (falsely) positive in 2% of the people free from the disease. If a person, selected at random from this population, has tested positive, what is the probability that she/he has the disease?

**Q11**

A fair square spinner with sides labelled 1, 2, 3 and 4 is spun twice. The two scores obtained are added together to give the total, $X$. Draw up the probability distribution table for $X$.

**Q12**

A fair 4-sided die, numbered 1, 2, 3 and 5, is rolled twice. The random variable $X$ is the sum of the two numbers on which the die comes to rest.

**a** Show that $\mathrm{P}(X = 8) = \frac{1}{8}$.

**b** Draw up the probability distribution table for $X$, and find $\mathrm{P}(X > 6)$.