Chapter 4 Test

1. Two hundred students have enrolled in at least one Grade 12 university course this year.

70 are in Chemistry   110 are in Physics
76 are in Biology   60 are in Chemistry and Physics
35 are in Physics and Biology   13 are in Biology and Chemistry
7 are in Chemistry, Biology, and Physics

(a) Draw a Venn diagram to represent this situation.
(b) Use the Venn diagram to determine the number of students who take Grade 12 courses but no Grade 12 university science courses.
(c) Determine the probability that a student selected at random from the group is taking Biology.
(d) Determine the probability that a student selected at random from the group is taking Chemistry or Physics.

2. Three playing cards—a jack, a queen, and a king—are placed in a box. A card is drawn from the box, its value is recorded, and then the card is put back into the box. The process is then repeated a second time.
(a) Draw the tree diagram for all possible outcomes of the two draws.
(b) Determine the number of outcomes in which a king is the first card drawn from the box.
(c) Find the probability that the first and second cards drawn are the same.

3. **Knowledge and Understanding** A five-card poker hand is dealt and the last card is turned face up. Determine the probability that you have been dealt four aces, given that the card turned over is an ace.

4. In how many ways can a group of 10 people be chosen from 6 adults and 8 children if the group must contain at least 2 adults?

5. **Communication** Mutually exclusive events are always independent. Is this true or false? Why?

6. **Application** Nine horses are entered in a horse race. If you "box" three horses (three are chosen and they can finish in any of the first 3 positions in the race), determine the probability that you will hold the winning ticket.

7. A drawer contains four red socks and five blue socks.
(a) Three socks are drawn one at a time and then put back before the next selection. Determine the probability that
  (i) exactly two red socks are selected
  (ii) at least two red socks are selected
(b) Repeat part (a) without replacement

8. **Thinking, Inquiry, Problem Solving** There are 25 students in a Data Management class. Determine the probability that at least two of them share the same birthday. (Assume that every year has 365 days.)