

6. On a TV game show, a contestant spins a spinner to randomly select a letter of the alphabet. At the same time, the contestant rolls a standard die. What is the total number of possible outcomes?
- A 32  
B 156  
C 308 915 776  
D 52
7. How many two-digit numbers can be formed from the digits 1, 2, 3, 4, 5 if repetition is
- a) permitted?                      b) not permitted?

### Apply

8. How many different outcomes are possible when rolling
- a) two 4-sided dice?  
b) three 4-sided dice?  
c) two 8-sided dice?  
d) four 8-sided dice?  
e) two 12-sided dice?  
f) five 12-sided dice?  
g)  $k$   $n$ -sided dice?
9. A business card design software package provides 25 templates, 38 fonts, and 20 colour combinations. How many different business card designs are available to the user?
10. Tonya has a job wrapping gifts during the holiday season. There are five colours of paper, six choices for ribbon, and three choices for bows. How many choices does the customer have in total?



11. In the game of Yahtzee, five dice are rolled. How many outcomes are there for rolling the five dice once?
12. **Application** A radio station plays a winning song once per hour at a randomly selected time (in minutes). During an announcer's four-hour show, how many different arrangements of winning times could occur if
- a) repetition of times during each hour is permitted?  
b) repetition of times during each hour is not permitted?
13. A combination lock uses the numbers from 0 to 59. Three numbers are dialed in the correct sequence. How many unique lock combinations are possible
- a) if repetition is permitted?  
b) if repetition is not permitted?

### ✓ Achievement Check

14. An eight-character password has been randomly assigned, containing digits and capital and lower-case letters, with repetition permitted.
- a) How many passwords are available in total?  
b) In how many ways could the password begin with four different capital letters, followed by four different digits?  
c) In how many ways could the password contain one digit and seven letters?
15. Licence plates consist of letters and/or digits. Calculate the number of licence plates that could be formed in each province or territory. Assume all numbers and letters are possible.
- a) Ontario, with four letters followed by three digits  
b) Québec, with three letters followed by three digits  
c) Northwest Territories, with six digits

16. Alberta licence plates have three letters followed by four digits. Is this approximately the same number of licence plates as Ontario? Explain without calculating the total number of Alberta plates.



17. When flying from Halifax to Vancouver on his preferred airline, Angus needs to stop over in Toronto. He has a choice of four morning flights to Toronto and six connecting afternoon flights to Vancouver. In how many ways could Angus travel from Halifax to Vancouver via Toronto?
18. **Communication** Will the number of outcomes for the following events be the same or different? Explain.
- A red die, a green die, and a white die are rolled at the same time.
  - Three white dice are rolled at the same time.
  - A die is rolled three times.
19. a) **Application** Simulate trying to break a security code using a graphing calculator. Think of a three-digit security code. On a graphing calculator, press **MATH**. From the PRB menu, choose **5: randInt**. Enter **randInt(0,9,3)** and press **ENTER** repeatedly until your security code comes up. How does that compare with the total number of possible three-digit security codes?
- b) How long do you think it would take to break a five-digit security code?
20. **Thinking** At Triple Pizza, every pizza has three different toppings. Triple Pizza advertises that you can choose from 4080 different pizzas. How could this be so?

21. **Application** Each question on a 10-question multiple choice test has four possible answers. In how many ways could the questions be answered if
- all questions must be answered?
  - the student is permitted to leave answers blank?

### Extend

22. **Thinking** An Ontario licence plate consists of four letters followed by three digits. Plates are assigned in numeric order, then alphabetic order. Assume all letters of the alphabet and all digits can be used. How many licence plates were assigned between the ones shown?



23. If repetition is not permitted, how many even three-digit numbers can be formed from the digits
- 1, 2, 3, 4, 5, 6?
  - 0, 1, 2, 3, 4, 5?
24. There are three grade 9, five grade 10, six grade 11, and nine grade 12 students on a student council. A committee is being formed with one student from each grade, plus an additional student from either grade 11 or 12. In how many ways could this committee be formed?
25. How many strings of five different letters can be formed from the alphabet if they must begin with a vowel and end with a consonant?