

# 8C 1 : Counting Principles

## Practice

- 1) There are 6 people in a race. In how many ways can they finish first, second or third ?
  
- 2) A golfer has 4 different hats, 3 gloves and 2 pairs of shoes to pick from for his round of golf. In how many ways can he make his choices ?
  
- 3) In Canada, postal codes consist of 6 characters -- three letters and three digits. Each postal code starts with a letter and alternates with a digit.
  - a. How many postal codes are there ?
  - b. How many start with the letter S ?
  - c. How many start with the letter S and end in the digit 8 ?
  - d. How many start with the letter S, digit 6 and NO letter or digit is repeated ?
  
- 4) Using the digits  $\{ 1, 2, 3, 4, 5 \}$ , how many positive three digit integers can be made if:
  - a. there are NO restrictions
  - b. it is odd and repetition is allowed ?
  - c. it is odd and repetition is NOT allowed ?
  - d. Repeat question a, b and c if the digits you can choose are  $\{ 0, 1, 2, 3, 4, 5 \}$ .
  
- 5) In how many ways can ALL of the letters of the word TRAVEL be arranged if:
  - a. there are NO restrictions ?
  - b. it must start with T ?
  - c. it starts with a consonant and ends in a vowel ?
  - d. the letters TR must stay together ?
  
- 6) How many positive even three-digit integers less than 400 can be formed from the digits  $\{ 0, 1, 2, 3, 4, 5 \}$  if:
  - a. repetition is allowed ?
  - b. No digit is repeated ?

- 7) You are ordering dinner at a restaurant. How many ways can you order a meal if you have two choices for a drink ( coffee or tea ), three main courses to choose from ( chicken, beef, or fish ) and two desserts ( pie or cake ) ?
- Draw a tree diagram
  - Use the fundamental counting principle
- 8) Eight sprinters are in the final of a race. How many different ways there to award the gold, silver and bronze medals ?
- 9) Television stations in Canada usually have call letters that are 4 letters long and begin with the letter C. If the CRTC made this a law in Canada, then how many television stations could the CRTC license ?
- 10) Repeat the above question using the restriction, repetition of letters is NOT allowed
- 11) Some license plates consist of 3 letters followed by 3 numbers. How many different license plates are possible if:
- if there are NO Restrictions
  - if the letters must be DIFFERENT
  - if the letters are different and the first digit can't be 0
- 12) How many two digit whole numbers can be formed using the digits: 0,1,2,4,6,7,8,9 ( 8 digits ) ?
- Repetitions are allowed
  - Repetitions are not allowed
- 13) An ice cream parlor features 64 flavors and 20 toppings, in 3 sizes. How many different sundaes can be made ?



key

1. 120
2. ~~24~~ 24
3. a) 17,576,000 b) 676,000 c) 67,600 d) 43,200
4. a) 125 b) 75 c) 36 d) 180, 90, 48
5. a) 720 b) 120 c) 192 d) 240
6. a) 54 b) 32
7. a) no b) 12
8. 336
9. 17,576
10. 13,800
11. a) 17,576,000 b) 15,600,000 c) 14,040,000
12. a) 56 b) 49
13. 3,840
14. 45
15. a) 28 b) 32
16. a) 20 b) 16
17. a) 4500 b) 2240
18. 5040
19. 1200
20. 720
21. 24
22. 6
23. 10,080
24. 144
25. 12,441,600