MAE 106: ASSIGNMENT 6

Quiz: 28 October 2016.

- (1) Show with a tree diagram the number of methods of travelling from Toronto to Vancouver via Calgary, if you can go from Toronto to Calgary either by plane or train and from Calgary to Vancouver by bus, plane, or train.
- (2) In how many ways can the letters of each word be arranged?
 - (a) MAXIMUM
 - (b) SASKATCHEWAN
 - (c) MISSISSAUGA
 - (d) UNINTERESTING
- (3) Seven sheets of coloured paper are on Shannon's desk. If there are four sheets of blue paper, and one each of red, yellow, and green paper, in how many ways can she stack the paper when she tidies her desk?
- (4) The RMC soccer team played a total of 14 games during the season. Their record was eight wins, four losses. and two ties. In how many orders could this have happened?
- (5) Given the diagram below, how many paths are there from home to school if Joni can only travel north or east?



(*Hint*: One possible path is *EEEEEENNNNN*. How many distinct permutations are there of *EEEEEENNNNN*?)

- (6) Explain the difference between *permutations* of three out of a group of seven objects and *combinations* of three out of a group of seven objects.
- (7) Which is larger: the number of ways of choosing three books from a shelf holding eight different books *or* the number of possible lists of the first, second, and third most popular books on that shelf. Why?
- (8) Evaluate each expression.
 - (a) $\binom{6}{2}$
 - (b) $\binom{12}{4}$
 - $\begin{pmatrix} c \end{pmatrix} \begin{pmatrix} q \\ q \end{pmatrix}$
 - (0) (9)

Date: 21 October 2016.

MAE 106: ASSIGNMENT 6

- (d) $\binom{8}{5}$
- (e) $\begin{pmatrix} 10\\7 \end{pmatrix}$
- (9) A club has 25 members.
 - (a) In how many ways can a committee of three members be chosen?
 - (b) In how many ways can the positions of president, secretary, and treasurer be filled?
- (10) If you are going on a five-day trip, in how many ways can you pick five pairs of socks from a drawer in which there are eight neatly-rolled pairs of socks?
- (11) Find the number of different five-card hands that could be dealt from a deck of 52 cards.
- (12) From a deck of 52 cards, how many different four-card hands could be dealt which include one card from each suit?
- (13) How many poker hands (five cards) are there with three aces and two kings? (Leave your answer as binomial coefficients.)
- (14) How many bridge hands (13 cards) contain five clubs, two hearts, three diamonds, and three spades? (Leave your answer as binomial coefficients.)
- (15) A deck of cards for Euchre consists only of 9s, 10s, jacks, queens, kings, and aces. Five-card hands are dealt to the players. How many Euchre hands contain
 - (a) at least three queens? (*Hint*: Take cases. Case 1: Three queens and two other cards. Case 2: Four queens and one other card.)
 - (b) at least two black cards? (*Hint*: Use indirect reasoning.)
- (16) Apples, grapes, peaches, plums, and strawberries are available for dessert. How many different combinations of fruit can be made for dessert? (Assume that you have to choose at least one fruit.)
- (17) Navel cadets from RMC wish to attend the Navel Association of Canada Conference in Ottawa. The navel cadet candidates consists of five males and five females. How many groups of four cadets can be formed with
 - (a) no further restrictions?
 - (b) four males?
 - (c) three males and a female?
 - (d) two males and two female?
 - (e) a male and three female?
 - (f) all female cadets?
- (18) Five friends go to a Chinese restaurant. The menu includes 14 dishes in Column A and 10 dishes in Column B. The dinner for five consists of three dishes from Column A and two dishes from Column B. How many different dinners for five could they choose?
- (19) (a) How many subsets are there for a set with six elements?
 - (b) How many of the subsets in (a) contain five elements?
- (20) (a) In how many ways can a committee of at least one person be formed from seven club members?

2

MAE 106: ASSIGNMENT 6

- (b) In how many ways can a committee of at least *two* persons be formed from seven club members?
- (21) In the Lotto 6/49 a ticket consists of 6 numbers that is selected from the set $\{1, 2, \dots, 49\}$.
 - (a) How many possible tickets are there?
 - (b) Suppose the winning ticket is 4, 8, 15, 16, 23, 42. How many tickets would have
 - (i) exactly one winning number?
 - (ii) exactly two winning numbers?
 - (iii) exactly three winning numbers?
 - (iv) at least one winning number?