Chapter Test

ACHIEVEMENT CHART				
Category	Knowledge / Understanding	Thinking / Inquiry / Problem Solving	Communication	Application
Questions	All	12	6, 12	5, 6, 7, 8, 9

1. Evaluate each of the following. List any calculations that require a calculator.

a) ${}_{25}C_{25}$

b) ${}_{52}C_{1}$

c) ${}_{12}C_{3}$

d) ${}_{40}C_{15}$

2. Rewrite each of the following as a single combination.

a) ${}_{10}C_{7} + {}_{10}C_{8}$

b) ${}_{23}C_{15} - {}_{22}C_{14}$

3. Use Pascal's triangle to expand

a) $(3x - 4)^4$

b) $(2x + 3y)^7$

4. Use the binomial theorem to expand

a) $(8x - 3)^5$

b) $(2x - 5y)^6$

5. A student fundraising committee has 14 members, including 7 from grade 12. In how many ways can a 4-member subcommittee for commencement awards be formed if

a) there are no restrictions?

b) the subcommittee must be all grade-12 students?

c) the subcommittee must have 2 students from grade 12 and 2 from other grades?

d) the subcommittee must have no more than 3 grade-12 students?

6. A track club has 20 members.

a) In how many ways can the club choose 3 members to help officiate at a meet?

b) In how many ways can the club choose a starter, a marshal, and a timer?

c) Should your answers to parts a) and b) be the same? Explain why or why not.

7. Statistics on the grade-12 courses taken by students graduating from a secondary school showed that

- 85 of the graduates had taken a science course
- 75 of the graduates had taken a second language
- 41 of the graduates had taken mathematics
- 43 studied both science and a second language
- 32 studied both science and mathematics
- 27 had studied both a second language and mathematics
- 19 had studied all three subjects

a) Use a Venn diagram to determine the minimum number of students who could be in this graduating class.

b) How many students studied mathematics, but neither science nor a second language?

8. A field-hockey team played seven games and won four of them. There were no ties.

a) How many arrangements of the four wins and three losses are possible?

b) In how many of these arrangements would the team have at least two wins in a row?

9. A restaurant offers an all-you-can-eat Chinese buffet with the following items:

- egg roll, wonton soup
- chicken wings, chicken balls, beef, pork
- steamed rice, fried rice, chow mein
- chop suey, mixed vegetables, salad
- fruit salad, custard tart, almond cookie

a) How many different combinations of items could you have?

b) The restaurant also has a lunch special with your choice of one item from each group. How many choices do you have with this special?

10. In the expansion of $(1 + x)^n$, the first three terms are $1 - 0.9 + 0.36$. Find the values of x and n.

11. Use the binomial theorem to expand and simplify $(4x^2 - 12x + 9)^3$.

12. A small transit bus has 8 window seats and 12 aisle seats. Ten passengers board the bus and select seats at random. How many seating arrangements have all the window seats occupied if which passenger is in a seat

a) does not matter? **b)** matters?

ACHIEVEMENT CHECK

Knowledge / Understanding	Thinking / Inquiry / Problem Solving	Communication	Application

13. The students' council is having pizza at their next meeting. There are 20 council members, 6 of whom are vegetarian. A committee of 3 will order six pizzas from a pizza shop that has a special price for large pizzas with up to three toppings. The shop offers ten different toppings.

a) How many different pizza committees can the council choose if there must be at least one vegetarian and one non-vegetarian on the committee?

b) In how many ways could the committee choose *exactly* three toppings for a pizza?

c) In how many ways could the committee choose *up to* three toppings for a pizza?

d) The committee wants as much variety as possible in the toppings. They decide to order each topping exactly once and to have at least one topping on each pizza. Describe the different cases possible when distributing the toppings in this way.

e) For one of these cases, determine the number of ways of choosing and distributing the ten toppings.