

**LESSON**  
**6.1**

# Practice C

For use with the lesson "Use Combinations and the Binomial Theorem"

**Find the number of combinations.**

1.  ${}_8C_2$

2.  ${}_6C_6$

3.  ${}_{12}C_9$

4.  ${}_{13}C_1$

**Find the number of possible 5-card hands that contain the cards specified. The cards are taken from a standard 52-card deck.**

5. 4 queens and 1 king

6. 3 of one kind (kings, queens, and so on) and 2 of a different kind

7. 2 of a kind, 2 of a second kind, and 1 other card

8. 3 face cards (kings, queens, or jacks) and 2 other cards (none of which are face cards) all 5 of the same suit

**Use the binomial theorem to write the binomial expansion.**

9.  $(2x - 1)^5$

10.  $(2x - y^2)^4$

11.  $(4x + y^3)^4$

12.  $(x^3 + y)^7$

13. Find the coefficient of  $x^6y^4$  in the expansion of  $(4x - 3y)^{10}$ .14. Find the coefficient of  $x^5y^{14}$  in the expansion of  $(2x + 5y^2)^{12}$ .
**Decide whether the problem requires *combinations* or *permutations* to find the answer. Then solve the problem.**

15. Eight members of a school marching band are auditioning for 3 majorette positions. In how many ways can students be chosen to be majorettes?

16. Thirty five students are running in a 5-kilometer race. In how many ways can the runners finish in first, second, and third place?

**Verify the identity. Justify your steps.**

17.  ${}_nC_{n-1} = n$

18.  ${}_mC_m - {}_nC_n = 0$

19.  ${}_{n+1}C_{n-1} = \frac{n(n+1)}{2}$

20. **Committees** A committee of four people is to be chosen from a group of 25 people.

a. Fifteen members of the group are women. In how many different ways can you make a committee of 2 women and 2 men?

b. Fifteen members of the group are women. In how many different ways can you make a committee of 2 or more women?

21. **Ice Cream Sundaes** An ice cream parlor has a choice of 12 different toppings. You can make your own sundae by choosing 1 or more toppings. You can afford at most four toppings. How many different types of ice cream sundaes can you order?