13-4A Lesson Master

**SKILLS** Objective C

1. Write as a factorial: $1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8$

2. Write as a quotient of factorials: $12 \cdot 13 \cdot 14 \cdot 15$

3. Write $\frac{20!}{16!}$ as a product of four numbers.

4. For what value of $n$ does $20 \cdot n! = 20!$?

**SKILLS** Objective D

5. **Multiple Choice** Which of the following is equal to $\binom{12}{9}$?
   
   A. $\frac{12!}{9! \cdot 3!}$  
   B. $\frac{12!}{9!}$  
   C. $\frac{12!}{3!}$  
   D. $\frac{12!}{9! \cdot 3!}$

6. If $d \leq 20$, write $\binom{20}{d}$ using factorials.

7. Evaluate:
   
   a. $\binom{100}{98}$  
   b. $\binom{72}{10}$

**USES** Objective H

8. A high school class has 120 students.
   
   a. They want to choose a four-person committee to plan a dance. How many different committees are possible?
   
   b. They want to choose a president, vice-president, secretary, and treasurer for the dance committee. How many different ways can this be done?

9. In a standard deck of cards, there are thirteen hearts: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K. In how many ways can five hearts be selected?

10. a. How many permutations are there of the letters in the word “MEAT”?
   
   b. List those that are also words in English.