

LESSON

11-1

Practice C

Permutations and Combinations

Evaluate.

1. $\frac{7! - 4!}{(6 - 3)!}$

2. $\frac{6!}{3!(8 - 5)!}$

3. $\frac{5!4!}{9!}$

4. ${}_{10}C_5$

5. ${}_7P_4$

6. ${}_{10}C_9$

Compare. Write $>$, $<$, or $=$.

7. ${}_8P_3 \square {}_6C_3$

8. ${}_{12}C_9 \square {}_{12}C_7$

9. ${}_9P_5 \square {}_{10}P_5$

Solve.

10. The door code to get into a top-secret laboratory is 6 digits. The first 3 digits of the code are all odd and the last 3 digits are all even. Digits can be used more than once. How many possible codes are there to gain access to this laboratory?

11. In how many ways can a 3-digit number be formed using the numbers 0–9, if each digit is used only one time?

12. The principal of the high school selects 4 Merit Scholars to attend a Town Council meeting. If there are a total of 12 Merit Scholars at the school, in how many ways can the students be selected?

13. A board of trustees is made up of 10 people. The board is choosing a chairperson, a secretary, and a publicist. If they have already decided upon a chairperson, in how many ways can they choose a secretary and a publicist?

14. There are 8 marbles in a bag. If they are all different colors, in how many ways can 4 marbles be chosen?

15. A student in a biology laboratory has 7 plants to use in an experiment. One plant will act as the control, 3 will be subjected to Environment A, and 3 will be subjected to Environment B. In how many ways can the student choose the plants that will be subjected to Environment B?

16. Holly wants to choose 5 different decorative tiles out of 8. If she plans to place the 5 tiles in a row, end to end, in how many different ways can she arrange them, from left to right?

Reading Strategies

1. 2 possible solutions
2. 4 possible solutions
3. 4 possible solutions
4. 2 possible solutions

LESSON 11-1

Practice A

- | | |
|------------------|-------------|
| 1. 12 | 2. 46,656 |
| 3. 120 | 4. 360 |
| 5. $\frac{1}{2}$ | 6. 210 ways |
| 7. 90 ways | 8. 24 |
| 9. 3 | 10. 20 |
| 11. 10 | 12. 1680 |
| 13. 6 | 14. 21 ways |
| 15. 120 ways | |

Practice B

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|----------------|----------------|
| 1. 8 T-shirts | 2. 24 packages |
| 3. 720 | 4. 720 |
| 5. 60,360 | 6. 90 ways |
| 7. 2184 ways | 8. 120 |
| 9. 3 | 10. 336 |
| 11. a. 91 ways | |
| b. 462 ways | |
| c. 2300 ways | |

Practice C

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|--------------------|------------------|
| 1. 836 | 2. 20 |
| 3. $\frac{1}{126}$ | 4. 252 |
| 5. 840 | 6. 10 |
| 7. > | 8. < |
| 9. < | 10. 15,625 codes |
| 11. 720 ways | 12. 495 ways |
| 13. 72 ways | 14. 70 ways |
| 15. 35 ways | 16. 6720 ways |

Reteach

- | | |
|-----------|--------|
| 1. 40,320 | 2. 120 |
|-----------|--------|

- | | |
|--------------|--------|
| 3. 3,628,800 | 4. 120 |
| 5. 15,120 | 6. 15 |
| 7. a. Yes | |
| b. 8 | |
| c. 6720 | |

$$8. {}_6P_4 = \frac{6!}{(6-4)!} = 360$$

- | | |
|-------|-------|
| 9. 10 | 10. 7 |
|-------|-------|

11. 126
12. a. No
- b. 56

$$13. {}_6C_2 = \frac{6!}{(6-2)!2!} = 15$$

Challenge

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|----------------|------------------|
| 1. 2160 | 2. 720 |
| 3. 2880 | 4. 1440 |
| 5. 479,001,600 | 6. 1,437,004,800 |
| 7. 48 | 8. 72 |

Problem Solving

1. a. $12 \times 11 \times 10 = 1320$
 b. Permutation; possible answer: the order of the 3 numbers matters.
2. a. 720 codes
 b. 5040 codes
 c. 151,200 codes
3. a. 78 ways
 b. Combination; possible answer: the order in which she chooses the locks does not matter.
4. Because order matters, *combination locks* represent permutations.
5. C
6. J

Reading Strategy

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|-----------------|-----------------|
| 1. 6 | 2. 12 |
| 3. 5 | 4. 5 |
| 5. 6 | 6. 7 |
| 7. Combination | 8. Permutation |
| 9. Combination | 10. Permutation |
| 11. Combination | |