Math 12 Pre-Calculus LG 18
PERMUTATIONS AND COMBINATIONS

INTRODUCTION:

Combinatorics is a branch of mathematics that involves the art of counting.   Check out pages 514 - 515.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:
1) Solve problems using the Fundamental Counting Principle.
2) Determine the number of permutations of n elements taken r at a time.
3) Solve counting problems when two or more elements are identical.
4) Solve an equation involving permutations.
5) Determine the number of combinations of n elements taken r at a time.
6) Solve an equation involving combinations.
7) Expand $(x + y)^n$ using the binomial theorem.

EVALUATION:

Write the LG 18 assessment quiz in the test centre.

RESOURCES NEEDED:

Math 12 Pre-Calc Text

THSS Math 12 Pre-Calc Learning Guides.

www.thssmath.com

LEARNING ACTIVITIES:

Expectation #1: Solve problems using the Fundamental Counting Principle.

Expectation #2: Determine the number of permutations of n elements taken r at a time.

Expectation #3: Solve counting problems when two or more elements are identical.

Expectation #4: Solve an equation involving permutations.

1. [Watch and take notes on instructional video on Fundamental Counting Principle.](#)

2. [Watch and take notes on instructional video on Permutations.](#)

3. [Watch and take notes on instructional video on Pathways.](#)

4. In the textbook, read Link the Ideas on page 517.
5. Work through Example 1 on pages 517-518 and complete the corresponding Your Turn questions.
6. Read the part on Factorial on the bottom of page 518 – 519.
7. Work through Example 2 on pages 519-520 and complete the corresponding Your Turn questions.
8. Read the part on Permutation with Repeating Objects on page 521.
9. Work through Example 3 & 4 on pages 521 - 522 and complete the corresponding Your Turn questions.
10. Read the part on Arrangements Requiring Cases on page 523.
11. Work through Example 5 on page 523 and complete the corresponding Your Turn questions.
12. Read Key Ideas on page 524. In your math journal, explain how the following using an example:
    1. The fundamental counting principle.
    2. Factorial notation.
    3. A permutation.
    4. A permutation involving identical objects.
13. In the textbook, complete pages 524 – 527 #1 – 8, 10 – 15, 19, 20, 24, 25, 31, C3.

Expectation #5: Determine the number of combinations of *n* elements taken *r* at a time.

Expectation #6: Solve an equation involving combinations.

1. [Watch and take notes on instructional video on Combinations.](#)

2. Read Link the Ideas on page 529 – 530.
3. Work through Examples 1 – 3 on pages 530 - 532 and complete the corresponding Your Turn questions.

4. Read Key Ideas on page 533. In your journal, explain using an example, the difference between a permutation and a combination. What formula is used to determine the combination of n objects taken r at a time?

5. In the textbook, complete pages 534 - 536 #1 – 6, 8, 10, 11, 14, 16 – 19, C1.

Expectation #7: Expand $(x + y)^n$ using the binomial theorem.

1. [Watch and take notes on instructional video on the Binomial Theorem.](#)

2. Read Link the Ideas on page 538.
3. Work through Example 1 on page 539 and complete the corresponding Your Turn questions.
4. Read the top part of page 540.
5. Work through Example 2 on pages 540 – 541 and complete the corresponding Your Turn questions.

6. Read Key Ideas on page 541. In your journal, describe how to expand the binomial $(x + y)^n$. Use an example to illustrate.

7. In the textbook, complete pages 542 - 545 #1 – 10, 17 – 19.

REVIEW AND CHALLENGE

1. In the textbook, complete Chapter 11 Review pages 546 - 547 #1 – 19.
2. Complete Chapter 11 Practice Test pages 548 #1 – 16.

Key Terms: fundamental counting principle, factorial, permutation, combination, Pascal's triangle, binomial theorem.

PRACTICE QUIZZES

[Practice quiz #1](#)
[Practice quiz #2](#)
[Practice quiz #3](#)
[Practice quiz #4](#)