Applying Number Patterns to Real-Life Problems and Mathematical Modeling

Introduction to Number Patterns

What is a Number Pattern?

A number pattern is a sequence of numbers that follows a specific rule or relationship. For example, the sequence 2, 5, 8, 11, 14 is a number pattern because each term increases by 3.

Activity 1: Identify the Pattern

Identify the next number in the pattern: 3, 6, 9, 12, 15

Real-Life Applications of Number Patterns

Case Study 1: Population Growth

A city's population is growing at a rate of 10% per year. If the current population is 100,000, what will the population be in 5 years?

Real-Life Applications

Number patterns have numerous real-life applications, including:

- Population growth
- Financial modeling
- Scientific simulations
- Engineering design

Mathematical Modeling

What is Mathematical Modeling?

Mathematical modeling is a powerful tool for solving real-world problems. It involves using mathematical concepts and techniques to describe and analyze real-life phenomena.

Activity 2: Mathematical Modeling

Use mathematical modeling to predict the population growth of a city over a period of 10 years, assuming a constant growth rate of 5% per year.

Activities and Exercises

Activity 3: Identify the Pattern

Identify the next number in the pattern: 2, 5, 8, 11, 14

Activity 4: Mathematical Modeling

A bakery sells 250 loaves of bread per day. If the owner wants to increase sales by 10% each day, how many loaves of bread will the bakery sell in 5 days?

Case Studies

Case Study 2: Company Profit

A company has a profit of $1000 in the first quarter and a loss of $500 in the second quarter. What is the net profit for the first half of the year?

Case Study 3: Population Growth

A population of bacteria grows at a rate of 20% per hour. If the initial population is 1000 bacteria, how many bacteria will there be after 3 hours?

Glossary of Terms

Key Terms

Number pattern: a sequence of numbers that follows a specific rule or relationship

Mathematical modeling: the use of mathematical concepts and techniques to describe and analyze real-life phenomena

Population growth: the study of how populations change over time

Assessment and Evaluation

Assessment Questions

1. What is the next number in the pattern: 3, 6, 9, 12, 15?

2. A city's population is growing at a rate of 10% per year. If the current population is 100,000, what will the population be in 5 years?

Conclusion

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In this welcome pack, we have explored the concept of number patterns, their real-life applications, and how to apply mathematical modeling to solve complex problems.

Additional Resources

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For further learning and practice, please visit our website or consult the following resources:

- Khan Academy: Number Patterns and Mathematical Modeling
- Math Playground: Number Patterns and Mathematical Modeling
- GeoGebra: Mathematical Modeling Software

Answer Key

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1. Activity 1: 18

2. Case Study 1: 161,051

3. Activity 2: 1,628,891