

Assessment/Evidence

Completed *Patterns and Puzzles* worksheet

Adaptations for Beginning Students

Beginning students could work with a partner or use a calculator to complete the assignment.

Adaptations for Advanced Students

More advanced students could complete more difficult KenKen puzzles; free, printable ones are available online at <http://www.mathdoku.com/>

Teacher Reflection/Lesson Evaluation

This lesson was created by Middletown ABLE.

Patterns

Patterns surround us, whether in fabrics, art, nature, music, or mathematics. The ability to identify, extend, or create patterns can be used in a variety of ways. Several examples include solving puzzles, designing spaces, or analyzing trends in the stock market.

Using your knowledge of algebra and geometry, complete the following patterns and explain your solutions.

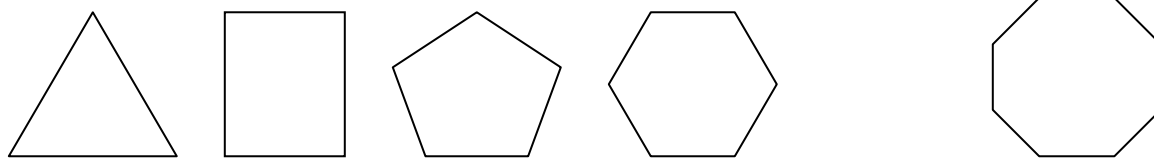
Pattern 1: 2, 4, 6, 8, _____
What is the pattern?
What would the 37th number in the pattern be?

Pattern 2: 1, 2, 4, 8, 16, _____, 64
What is the pattern?

Pattern 3: $1, \sqrt{2}, \sqrt{3}, 2, \underline{\hspace{1cm}}, \sqrt{6}, \sqrt{7}, \sqrt{8}, \underline{\hspace{1cm}}$
Explain the pattern.

Pattern 4: 3, 9, 27, 81, _____
Write a formula that could be used to extend this sequence.

Pattern 5:



Pattern 6: 0, 1, 3, 6, 10, 15, _____
Explain the pattern of these numbers.

Pattern 7: Create a new sequence and explain how one would extend it to 10 places.

Puzzles

Math can be used to solve a number of puzzles, particularly logic puzzles and KenKen or Sudoku.

Directions:

Fill-in the table with the appropriate numbers where:

- 4x4 tables use only numbers 1-4; 6x6 tables use only 1-5; 8x8 tables use only 1-8.
- Each row contains exactly **one** of each digit with no repeats
- Each column contains exactly one of each digit with no repeats
- Each bold-outlined group of cells contains a clue with a number and symbol. The symbol represents the mathematical operation and the number represents the result.
- For example, if the clue for a group of 2 blocks is "7+", some possible answers could be 1+6, 3+4, or 2+5

12*		4+	
2/	1-	1-	
			9+
3-			

Directions and puzzle from: www.mathdoku.com

Patterns

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Using your knowledge of algebra and geometry, complete the following patterns and explain your solutions.

Pattern 1: 2, 4, 6, 8, _____ (10)

What is the pattern? (even)

What would the 37th number in the pattern be? (74)

Pattern 2: 1, 2, 4, 8, 16, _____, 64 (32)

What is the pattern? (doubling)

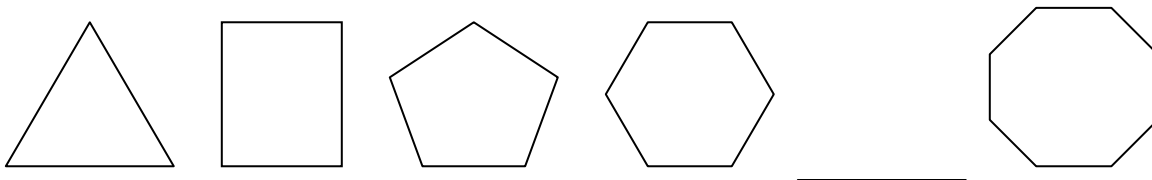
Pattern 3: $1, \sqrt{2}, \sqrt{3}, 2, \underline{\hspace{1cm}}, \sqrt{6}, \sqrt{7}, \sqrt{8}, \underline{\hspace{1cm}}$ ($\sqrt{5}, 3$)

Explain the pattern. (square roots)

Pattern 4: 3, 9, 27, 81, _____ (243)

Write a formula that could be used to extend this sequence. $3^{(n)}$

Pattern 5:



Pattern 5 will be completed by drawing a 7-sided shape.

Pattern 6: 0, 1, 3, 6, 10, 15, _____ (21)

Explain the pattern of these numbers. (differences between numbers are increasing by one – 1, 2, 3, 4, 5)

Pattern 7: Create a new sequence and explain how one would extend it to 10 places.

(Answers will vary.)

Puzzles

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12*		4+	
3	4	1	2
2/	1-	1-	
2	3	4	1
			9+
1	2	3	4
3-			
4	1	2	3

Directions and puzzle from: www.mathdoku.com

12*		4+	
2/	1-	1-	
			9+
3-			