ANSWERS

1. a and c
2. 127, 255
3. 180, 177
4. A = 102, B = 171
5. Multiply IN by itself and add 2.
6. 98
7. 25, 35
8. 45, 135
9. 155
10. 95
11. -55
12. -3 times IN and add 2
13. E = 61
    F = 125
14. G = 90
    H = 186
15. The IN number added to next IN number OR 3 times IN plus 3

BASIC MATH

The Complete Course
Lesson Twenty Three

Number Patterns 1

KA8423

Teaching Guide & Worksheet

HOW TO USE THE VIDEO AND TEACHING GUIDE

1. The "STOP TO THINK" signal means pause to think.
2. The "STOP TO WORK" signal means work the problem(s).
3. Rewind the tape and watch the lesson again if the concept is not clear.
4. Use “Learning Strategies” section of the Teachers Guide as memory aids and topics for classroom discussion.
5. Students should complete the exercises on the worksheet to confirm their understanding of this lesson.

LEARNING STRATEGIES

ADDING ODD AND EVEN NUMBERS

A. Examine the sums of:
   1. An odd plus an odd
   2. An odd plus an even
   3. An even plus an even
   4. Three odd numbers
   5. Two even numbers plus one odd
   6. Two odd numbers plus one even
   7. Three even numbers
B. The sum obtained by adding even numbers is always even
C. The sum obtained by adding an even number of odd numbers is always even
D. The sum obtained by adding an odd number of odd numbers is always odd

MULTIPLYING ODD AND EVEN NUMBERS

A. Why do we determine whether a number is odd or even by examining only the ones place?
   1. All the whole-number places other than the ones place are even numbers since they each end in zero
   2. Only the ones place is an odd-numbered place value
B. The product of an odd times an odd is always odd
C. The product of any number of odd numbers is always odd
D. One even multiplier in a computation makes the product even

PATTERNS OF MULTIPLES

A. Using a grid of the numbers from one through fifty, we make visual discoveries about the patterns among:
   1. Multiples of three
   2. Multiples of nine
   3. Multiples of seven
B. Divisibility rules for multiples of:
   1. Two
   2. Three
   3. Five
   4. Nine

SEQUENCES

A. A sequence is a list of numbers in which one can easily predict the next number by examining the previous numbers
B. In an arithmetic sequence the next number is found by adding a common difference to the previous number
   1. 6, 10, 14, 18, ?
   2. You add four each time
   3. ? = 22
C. In a geometric sequence the next number is found by multiplying the previous number by a common ratio
   1. 5, 15, 45, 135, ?
   2. You multiply by three each time
   3. ? = 405
D. Finding patterns in sequences
   1. Examine the differences between succeeding terms
   2. Seek multiplicative patterns
   3. Some patterns are simply tricks, some of which have nothing to do with arithmetic

PATTERNS INVOLVING PAIRS OF NUMBERS

A. Given "input" and "output" numbers, find a rule to find the output if you are given the input
   1. 3 ⇒ 6, 5 ⇒ 10, 14 ⇒ 28, 19 ⇒ ?
   2. Output is double the input
   3. 19 ⇒ 38
B. A function is a rule that provides only one item of output for each item of input
C. A function may be written using x for the input and y for the output
D. For example, y = 2x + 6 is a rule which requires that an input number be doubled and then six is added to the product
   1. x = 3, y = 2(3) + 6 = 12
   2. x = -3, y = 2(-3) + 6 = 0

WORKSHEET STRATEGIES

1. Determine which number(s) is (are) divisible by three

   a) 4722

   b) 90361

   c) 13761

Fill in the next two numbers in the sequence

2. 7, 15, 31, 63, ____, ____

3. 8, 24, 21, 63, 60, ____, ____

IN	2	5	8	9	10	13
OUT	6	27	66	83	A	B

4. Find the numbers of A and B

5. State the rule

6. Find the largest two-digit number NOT divisible by 3

Use the following to answer 7-9
5, 15, ____, ____, ____

7. Fill in the next two terms to make this an arithmetic sequence

8. Fill in the next 2 terms to make this a geometric sequence

9. Fill in the last term if the next two terms are 35, 75

IN	-4	2	9	-12	-31	19
OUT	14	-4	-25	38	C	D

10. What is C?

11. What is D?

12. What is the rule?

IN	1	5	13	29	E	F
OUT	6	18	42	G	H	

13. If the IN numbers form a sequence find E and F

14. What are G and H?

15. What is the rule?