Secret Sequences

Simple Sequences

A *sequence* is a set of numbers which follows a mathematical rule and a specific order.

Sample
(3, 6, 12, 24, 48, . . .)   Each term after the first is multiplied by 2.

Directions: Study the Facts and Reminders page for this unit. Complete these sequences by filling in the blanks. Write the rule which the sequence follows. The first problem has been partially done for you.

1. (2, 4, 6, 8, 10, ____, ____, ____, ____)   Rule: add 2 or $n + 2$

2. (1, 2, 3, ____, ____, 6, 7, ____, ____)   Rule: _____

3. (9, 13, 17, ____, ____, 29, 33, ____, ____)   Rule: _____

4. (6, 14, 22, 30, ____, ____, 54, 62, ____, ____)   Rule: _____

5. (5, 10, 15, ____, ____, ____, 35, 40, ____)   Rule: _____

6. (7, 10, 13, ____, ____, 22, 25, ____, ____)   Rule: _____

7. (40, 38, 36, 34, ____, ____, ____, ____)   Rule: _____

8. (132, 121, 110, 99, ____, ____, ____, ____)   Rule: _____

9. (98, 93, 88, ____, ____, 73, 68, ____, ____)   Rule: _____

10. (4, 10, 16, ____, ____, 34, ____, 46, ____)   Rule: _____

11. (1, 2, 4, 8, ____, ____, ____, 128, ____)   Rule: _____

12. (1, 3, 9, 27, ____, ____, ____, ____)   Rule: _____

13. (3, 6, 12, ____, 48, ____, ____, ____)   Rule: _____

14. (1, 4, 16, 64, ____, ____, ____, ____)   Rule: _____

15. (5, 15, 45, ____, ____, ____, ____)   Rule: _____

16. (1, 5, 25, ____, 625, ____, ____, ____)   Rule: _____

17. Can you find the rule and complete this sequence?

(2048, ____, 512, ____, 128, ____, 32, ____)   Rule: _____

Secret Sequences

Harder Sequences

Some sequences involve squared numbers or cubed numbers like the example below.

  (1, 4, 9, 16, 25)   Rule: counting numbers squared

Some sequences use two operations like the example below.

  (1, 4, 13, 40, 121)   The two operations are multiply by 3 and add 1.
               The rule can be written this way: $(n \times 3) + 1$

Directions: Study the Facts and Reminders page for this unit. Complete these sequences by filling in the blanks. Write the rule which the sequence follows.

1. (2, 5, 11, 23, ____, ____, ____, ____)   Rule: _____

2. (3, 10, 31, ____, ____, 850, ____, ____)   Rule: _____

3. (1, 6, 26, 106, ____, ____, ____, ____)   Rule: _____

4. (1, 2, 7, 32, 157, ____, ____, ____, ____) Rule: _____

5. (1, 4, 9, ____, ____, 36, ____, ____, ____) Rule: _____

6. (1, 8, 36, 148, ____, ____, ____, ____)   Rule: _____

7. (4, 11, 32, 95, ____, ____, ____, ____)   Rule: _____

8. (1, 5, 33, 229, ____, ____, ____, ____)   Rule: _____

9. (5, 13, 29, 61, ____, ____, ____, ____)   Rule: _____

10. (7, 15, 31, ____, 127, ____, ____, ____, ____) Rule: _____

11. (−10, −8, −5, −1, +4, +10, ____, ____, ____, ____) Rule: _____

12. (27, 26, 24, 21, 17, ____, ____, −1, −9, −18, ____) Rule: _____

13. (100, 90, 81, 73, ____, ____, ____, ____) Rule: _____

14. (2, 3, 5, 7, 11, 13, ____, ____, ____, ____) Rule: _____

15. (1, 8, 27, 64, ____, ____, ____, ____)   Rule: _____

16. (−10, −5, +1, +8, +16, ____, ____, ____, ____) Rule: _____

17. (−30, −20, −11, −3, +4, +10, ____, ____, ____, ____) Rule: _____

18. (2, 5, 10, 17, 26, ____, ____, 65, ____, ____) Rule: _____

Secret Sequences

Fibonacci Sequence

The *Fibonacci sequence* is the most famous of all sequences in math. Every number after the first two 1s is computed by adding the two previous numbers.

(1, 1, 2, 3, 5, 8, 13, 21, 34, 55)   Rule: add the previous two numbers

1 + 1 = **2**   1 + 2 = **3**   2 + 3 = **5**   3 + 5 = **8**

Directions: Answer the following questions.

1. Extend the Fibonacci sequence to 20 terms.

   (1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____)

2. Compute the sum of the first ten numbers in the Fibonacci sequence. _____

3. Multiply the seventh term in the sequence (13) times 11. _____ You should get the same number. Double-check your work if your answers did not match.

Directions: Complete these Fibonacci sequences by filling in the blanks. Compute the sum of the first ten terms in each sequence. Multiply the seventh term in the sequence times 11.

4. (3, 3, 6, 9, 15, _____, _____, _____, _____, _____)   Sum: _____

   Product: 11 x _____ = _____

5. (7, 7, 14, 21, 35, _____, _____, _____, _____, _____)   Sum: _____

   Product: 11 x _____ = _____

6. (10, 10, 20, 30, 50, _____, _____, _____, _____, _____)   Sum: _____

   Product: 11 x _____ = _____

7. (5, 6, 11, 17, 28, _____, _____, _____, _____, _____)   Sum: _____

   Product: 11 x _____ = _____

8. (5, 5, 10, 15, 25, _____, _____, _____, _____, _____)   Sum: _____

   Product: 11 x _____ = _____

9. Use the Fibonacci sequence to answer this problem. If the first term of the sequence represented this year, what year would be represented by the fifth term? _____ What year would be represented by the eighth term? _____