Name: Date:

WORKSHEET :

Fibonacci Sequences

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the sequence type.

1) 0, 1, 1, 2, 3, 5, 8...

2) 996, 2, 998, 1000, 1998...

3) 1, 2, 3, 5, 8, 13....

4) 1, 3, 9, 27....

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the next term in the sequence.

5) 0, 1, 1, 2, 3, 5, 8...

6) 996, 2, 998, 1000, 1998...

7) 1, 2, 3, 5, 8, 13....

8) 0, 0, 0, ...

9) -10, 3, -7, -4...

10) 5, -10, -5...

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the *n*th term in the sequence.

11) 2, 3, 5, 8... $A_6 = ?$

12) $A_{999} = 1{,}000$ $A_{1000} = ?$

13) 6, 9, 15.... $A_6 = ?$

14) -10, 3, -7, -4... $A_6 = ?$

ANSWERS :

Fibonacci Sequences

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the sequence type.

1) 0, 1, 1, 2, 3, 5, 8... Fibonacci

2) 996, 2, 998, 1000, 1998... Fibonacci

3) 1, 2, 3, 5, 8, 13.... Fibonacci

4) 1, 3, 9, 27.... Geometric

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the next term in the sequence.

5) 0, 1, 1, 2, 3, 5, 8... 13

6) 996, 2, 998, 1000, 1998... 2,998

7) 1, 2, 3, 5, 8, 13.... 21

8) 0, 0, 0, ... 0

9) -10, 3, -7, -4... -11

10) 5, -10, -5... -15

Fibonacci Sequence $\mathbf{A_n = A_{n-1} + A_{n-2}}$ Identify the 6th term in the sequence.

11) 2, 3, 5, 8... $A_6 = 21$

12) $A_{999} = 1{,}000$ $A_{1000} = \Phi \times 1{,}000 = 1.618... \times 1{,}000 \approx 1{,}618$

13) 6, 9, 15.... $A_6 = 63$

14) -10, 3, -7, -4... $A_6 = -15$

KEY CONCEPTS:

A sequence is a set of numbers where every term is defined by some rule. One basic rule of sequences is a Fibonacci style sequence where each term is the sum of the two previous terms.

1. **Fibonacci Sequence** -

$\mathbf{A_n = A_{n-1} + A_{n-2}}$

A_n = *n*th term in the sequence
A_{n-1} = The previous term in the sequence
A_{n-2} = The 2nd previous term in the sequence i.e. two terms ago

a) The sequence rule above typically permits the calculation of the *n*th term in a Fibonacci sequence only by process of iteration i.e. finding the next term then the next term then the next term etc.
b) There exists a formula (Binet's Formula) for calculating the nth term of a Fibonacci sequence directly, but it is beyond the scope of this course and the exam and thus not required.
c) As the number of terms, n, gets high the next term in a Fibonacci sequence behaves like a geometric sequence and is defined by a multiplier that approaches the value known as the Golden Ratio $\Phi = 1.618...$ e.g. If $A_{50} = 100$ then $A_{51} \approx 161.8$