Lesson 2-1

Example 1

Identify the pattern 1, 4, 7, _____, _____, _____, and find the next three terms.

Solution

In this pattern, three is added each time.

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1        4        7        10        13        16
 \      / \      / \      /  \      /  \      /
    +3       +3       +3        +3        +3
```

Then next three terms are 10, 13, and 16.

Example 2

In the sequence 1, 8, 27, 64, …, identify the rule relating each term to its position number. Then find the 7th term and the 9th term.
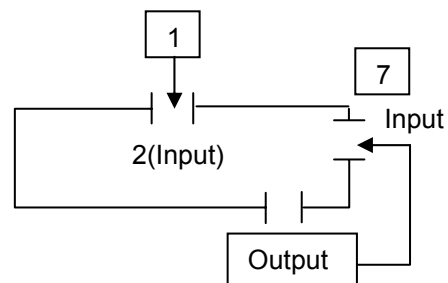
Solution

Each term in the sequence 1, 8, 27, 64,…, is found by taking the cube if its position number. The 7th term is 7^3, or 343. Likewise the 9th term is 9^3 or 729.

Position Number	1	2	3	4
Term	$1^3 = 1$	$2^3 = 8$	$3^3 = 27$	$4^3 = 64$

Example 3

The sequence 1, 2, 4, 8,…, can be modeled using an iteration diagram. Draw the diagram and calculate the output for 7 iterations.

Solution

Initial Value (input): 1   Number of iterations: 7
Rule: Multiply input by 2   Output: 2, 4, 8, 16, 32, 64, 128

Example 4

NEWSPAPER A printing machine has an expected life of six years, a beginning book value (cost when bought) of $60,000, and a depreciation rate of 20% per year. Find the ending book value after six years.

Solution

Calculate the output for 6 iterations.

Year 1	Beginning book value	Depreciation rate	Annual depreciation	Ending book value
1	$60,000.00	0.20	$12,000.00	$48,000.00
2	$48,000.00	0.20	$9,600.00	$38,400.00
3	$38,400.00	0.20	$7,680.00	$30,720.00
4	$30,720.00	0.20	$6,144.00	$24,576.00
5	$24,576.00	0.20	$4,915.20	$19,660.80
6	$19,660.80	0.20	$3,932.16	$15,728.64

The ending book value is $15,728.64.