

Elementary Math Models  
**Worksheet: Number Patterns 1**

1. For each of the tables below, the sequence values were generated using a pattern. The arrows, circles and squares indicate how the pattern works. Use the same pattern to complete each table. Then write a description of the pattern in words, and indicate whether or not the pattern is recursive.

position	term
0	(10)
1	(10) + 3 = (13)
2	(13) + 3 = (16)
3	(16) + 3 = 19
4	
5	
6	

position	term
0	(13)
1	(13) - (1) = (12)
2	(12) - (2) = (10)
3	(10) - (3) = 7
4	
5	
6	

position	term
0	$\frac{0(0+1)}{2} = 0$
1	$\frac{1(1+1)}{2} = 1$
2	$\frac{2(2+1)}{2} = 3$
3	$\frac{3(3+1)}{2} = 6$
4	
5	
6	

2. For each of the following number sequences, find a pattern. Write a verbal description of your pattern, and indicate whether or not the pattern is recursive. It will probably help if you use the sequence tables as we did in class.

a. 3, 6, 9, 12, 15, ...

b. 1, 2, 4, 8, 16, ...

c. 1, 4, 9, 25, 36, ...

d. 5, 8, 11, 14, 17, ...

e. 1, 1, 2, 3, 5, 8, ...

f. 1, 10, 100, 1000, ...

g. 5, 55, 555, 5555, 55555, ...

h. 1, 2, 6, 12, 20, 30, ...

i.  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots$

j.  $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \dots$

3. For each part use the described pattern to work out the first 8 terms of a number sequence. Indicate whether each pattern is recursive.

a. Each term of the sequence is found by adding 5 to the preceding term. The starting term is 3.

b. Each term of the sequence is found by multiplying the preceding term by  $\frac{1}{2}$ . The starting term is 80.

c. Each term of the sequence is found by multiplying the position number by 7 and adding 3 to the result.

d. Each term of the sequence is found by multiplying its position number by the preceding term. The starting term is 1.]

4. A school board is trying to plan for the future. They have been studying enrollments in the school district and have found the following data:

<i>Year</i>	<i>Students</i>
90	24.4
91	27.6
92	30.8
93	34.0
94	37.2

In the table, the number of students is expressed in units of thousands. That means that 24.4 is 24.4 thousands, or 24,400. Look for a pattern in the table, and use the pattern to predict the school enrollment for 1999.