F.LE.A.1: Families of Functions 2

1   Caleb claims that the ordered pairs shown in the table below are from a nonlinear function.

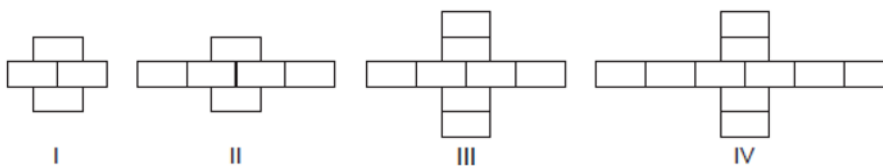| x	f(x)
0	2
1	4
2	8
3	16

   State if Caleb is correct. Explain your reasoning.

2   The function, $t(x)$, is shown in the table below.

x	t(x)
−3	10
−1	7.5
1	5
3	2.5
5	0

Determine whether $t(x)$ is linear or exponential. Explain your answer.

3   Breanna creates the pattern of blocks below in her art class.

I   II   III   IV

   A friend tells her that the number of blocks in the pattern is increasing exponentially. Is her friend correct?
   Explain your reasoning.

4   Consider the pattern of squares shown below:

Which type of model, linear or exponential, should be used to determine how many squares are in the nth pattern? Explain your answer.

5   Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

Number of Hours, x	1	2	3	4	5	6	7	8	9	10
Number of Bacteria, B(x)	220	280	350	440	550	690	860	1070	1340	1680

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

6   The number of people who attended a school's last six basketball games increased as the team neared the state sectional games. The table below shows the data.

Game	13	14	15	16	17	18
Attendance	348	435	522	609	696	783

State the type of function that best fits the given data. Justify your choice of a function type.

7   The table below shows the value of a particular car over time.

Time (years)	Value (dollars)
0	20,000
5	10,550
10	5570
15	2940
20	1550

Determine whether a linear or exponential function is more appropriate for modeling this data. Explain your choice.

F.LE.A.1: Families of Functions 2
Answer Section

1 ANS:
   Yes, because $f(x)$ does not have a constant rate of change.

   REF: 061826ai
2 ANS:
   Linear, because the function has a constant rate of change.

   REF: 011625ai
3 ANS:
   No, because the number of blocks is increasing by a constant amount.

   REF: 062327ai
4 ANS:
   Exponential, because the function does not have a constant rate of change.

   REF: 081627ai
5 ANS:
   Exponential, because the function does not grow at a constant rate.

   REF: 081527ai
6 ANS:
   Linear, because the function grows at a constant rate.
   $$\frac{435-348}{14-13}=\frac{522-435}{15-14}=\frac{609-522}{16-15}=\frac{696-609}{17-16}=\frac{783-696}{18-17}=\frac{87}{1}$$

   REF: 011926ai
7 ANS:
   Exponential, as the value decreases by about 47%/year.

   REF: 082226ai