Growing, Growing Investigation 3.1 and Scientific Notation

ucing Rabbits

a small number of rabbits were introduced to Australia by English settlers. The rabbits ural predators in Austrailia, so they reproduced rapidly and became a serious problem, ses intended for sheep and cattle.

s had counted the rabbits in Australia in the years after they were introduced, they might cted data like these:

le shows the rabbit population xponentially.

Growth of Rabbit Population

Time (yr)	Population
0	100
1	180
2	325
3	583
4	1,050

the growth factor? 1.8 Show how you found your answer. 180 ÷ 100

the growth pattern continued. Write an equation for the rabbit population, p, for any year, rabbits were first introduced. Explain what the numbers in your equation represent.

$p = 100 \cdot 1.8^n$

ny rabbits will there be in 10 years? $100 \cdot 1.8^{10} = 35{,}705$

ny will there be after 25 years? $100 \cdot 1.8^{25} = 240{,}886{,}592$ After 50 years? $100 \cdot 1.8^{50} = 5.8 \times 10^{14}$

w many years will the rabbit population exceed one million? 16 years or between 15 & 16 yrs

e that during a different time period, the rabbit population could be predicted by the $= 15\,(1.2^n)$, where p is the population in millions, and n is the number of years.

the growth factor? _____ 2. What is the initial population? _____

ble shows that the elk population in a state rowing exponentially.

the growth factor? _____

you got your answer. _____

e that this growth patterns continues.

elk will there be in 10 years? _____ 15 years? ____

Growth of Elk Population

Time (yr)	Population
0	30
1	57
2	108
3	206
4	391
5	743

Suppose the population is growing **linearly**. What is the pattern in the population from one month to the next? Add 10

b. Suppose the population is growing **linearly**. Complete the table.

# of Months	# of Beetles
0	5
1	15
2	
3	
4	

c. Write an equation for the number of beetles, b, after m months if the beetle population is growing **linearly**. _____

d. How long will it take the population to reach 200 if it is growing **linearly**? _____

e. Suppose the population is growing **exponentially**. What is the pattern in the population from one month to the next? multiply 3

f. Suppose the population is growing **exponentially**. Complete the table.

# of Months	# of Beetles
0	5
1	15
2	
3	
4	

g. Write an equation for the number of beetles, b, after m months if the beetle population is growing **exponentially**. _____

h. How long will it take the population to reach 200 if it is growing **exponentially**? _____

4. Each table shows exponential growth or a linear relationship. Complete each table. Fill in the anks. (page 9)

Table A

t	0	1	2	3	4
m	8	24	72	216	

Linear or exponential? _____ Equation: _____

Table B

t	0	1	2	3	4
p	15	18	21	24	

inear or exponential? _____ Equation: _____

Table C

n	0	1	2	3	4	10
a	5	7.5	11.25	16.88		

inear or exponential? _____ Equation: _____

able D

s	0	1	2	3	4	20
m		8.5	6	3.5		

near or exponential? _____ Equation: