Lesson 8 Practice Problems

1. A pattern of dots grows exponentially. The table shows the number of dots at each step of the pattern.

step number	0	1	2	3
number of dots	1	5	25	125

   a. Write an equation to represent the relationship between the step number, n, and the number of dots, y.

   b. At one step, there are 9,765,625 dots in the pattern. At what step number will that happen? Explain how you know.

2. A bacteria population is modeled by the equation $p(h) = 10{,}000 \cdot 2^h$, where h is the number of hours since the population was measured.
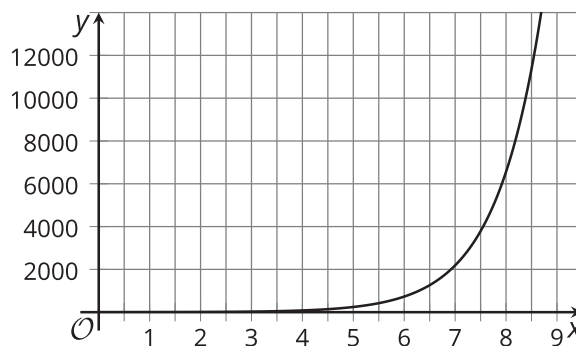
   About how long will it take for the population to reach 100,000? Explain your reasoning.

3. Complete the table.

x			-2	0	$\frac{1}{3}$	1		
10^x	$\frac{1}{10{,}000}$	$\frac{1}{1{,}000}$	$\frac{1}{100}$				1,000	1,000,000,000

4. Here is a graph of $y = 3^x$.

   What is the approximate value of x satisfying $3^x = 10,000$? Explain how you know.
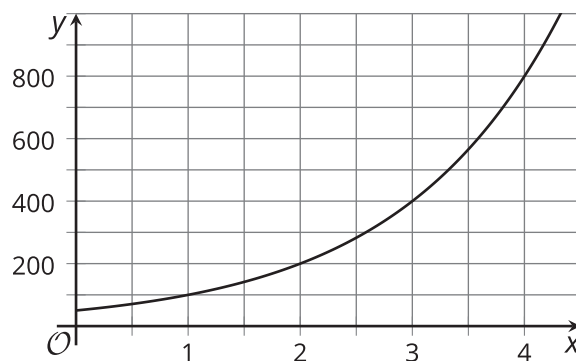
5. One account doubles every 2 years. A second account triples every 3 years. Assuming the accounts start with the same amount of money, which account is growing more rapidly?

6. How would you describe the output of this graph for:

   a. inputs from 0 to 1

   b. inputs from 3 to 4

(From Unit 4, Lesson 1.)

7. The half-life of carbon-14 is about 5730 years.

    a. Complete the table, which shows the amount of carbon-14 remaining in a plant fossil at the different times since the plant died.

    b. About how many years will it be until there is 0.1 picogram of carbon-14 remaining in the fossil? Explain how you know.

years	picograms
0	3
5730	
$2 \cdot 5730$	
$3 \cdot 5730$	
$4 \cdot 5730$	

(From Unit 4, Lesson 7.)