### 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 |

* 1. Write an equation to represent the relationship between the step number, , and the number of dots, .
  2. At one step, there are 9,765,625 dots in the pattern. At what step number will that happen? Explain how you know.

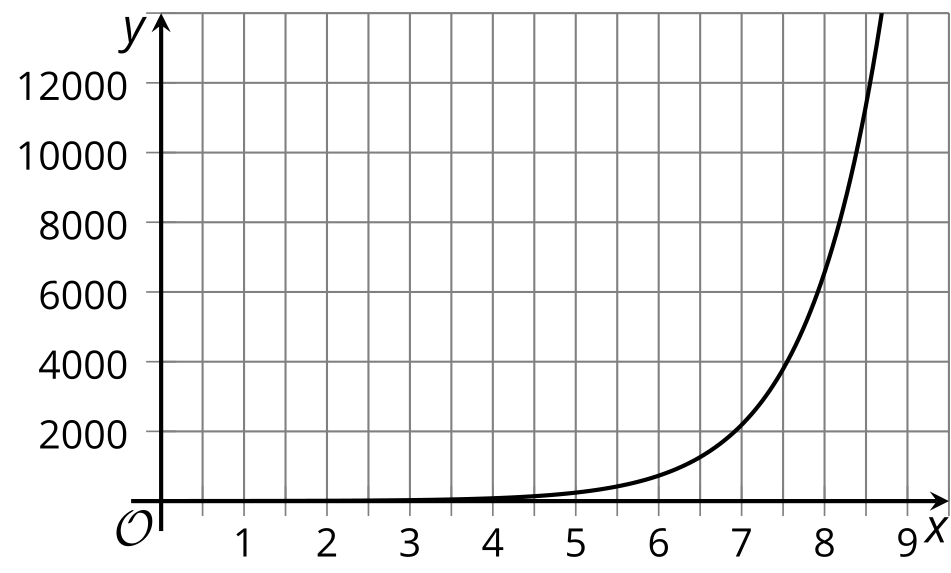
1. A bacteria population is modeled by the equation , where is the number of hours since the population was measured.

* About how long will it take for the population to reach 100,000? Explain your reasoning.

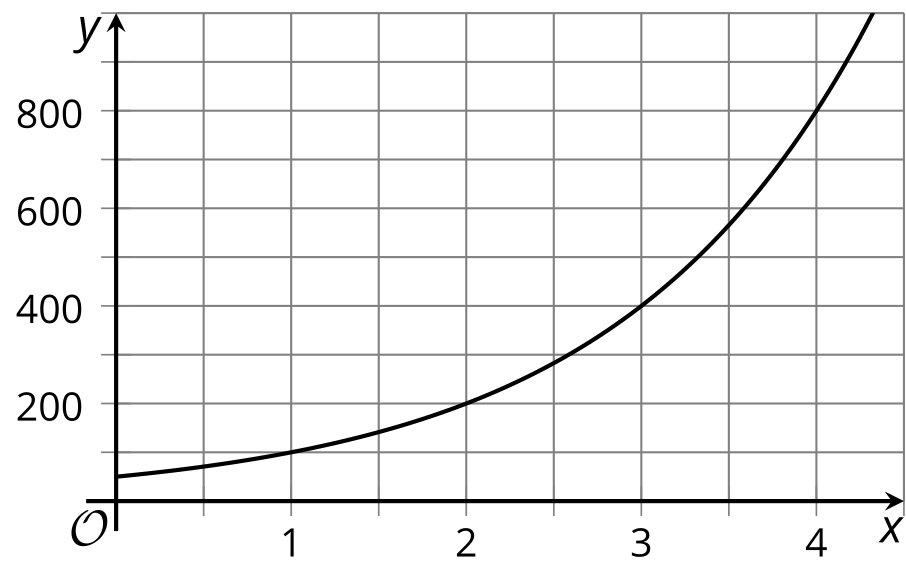
1. Complete the table.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | * -2 | * 0 |  | * 1 |  |  |
|  |  |  |  |  |  |  | * 1,000 | * 1,000,000,000 |

1. Here is a graph of .

* What is the approximate value of satisfying ? Explain how you know.
* 

1. 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?
2. How would you describe the output of this graph for:
   1. inputs from 0 to 1
   2. inputs from 3 to 4

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* (From Unit 4, Lesson 1.)

1. The half-life of carbon-14 is about 5730 years.
   1. Complete the table, which shows the amount of carbon-14 remaining in a plant fossil at the different times since the plant died.
   2. 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 |  |
|  |  |
|  |  |
|  |  |

* (From Unit 4, Lesson 7.)



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