Math 3

Toolkit #7:
Exponentials

Name: _____

Date: _____

Period: A1 A2 A3 B1 B2 B3

G_

Multiple representations of Exponentials

Situation:

Susan got two rabbits from the animal shelter last summer. A month later, those rabbits have babies and then she had 6 rabbits. After a few months she realized that her number of rabbits triples every month. At this rate, how many rabbits will she have a year after she first got the rabbits?

$y = 2(3)^{12} = 2(531{,}441)$

$= 1{,}062{,}882$

Equation:

$y = ab^x$

a = initial value
b = multiplier

Define variables:

Let x represent time since Susan got the rabbits (in months).

Let y represent the # of rabbits.

Equation: $y = 2(3)^x$

Table:

Time (months)	# of rabbits
0	2
1	6
2	18
3	54
4	162
5	486
6	1,458
7	4,374
8	13,122
9	39,366
10	118,098
11	354,294
12	1,062,882

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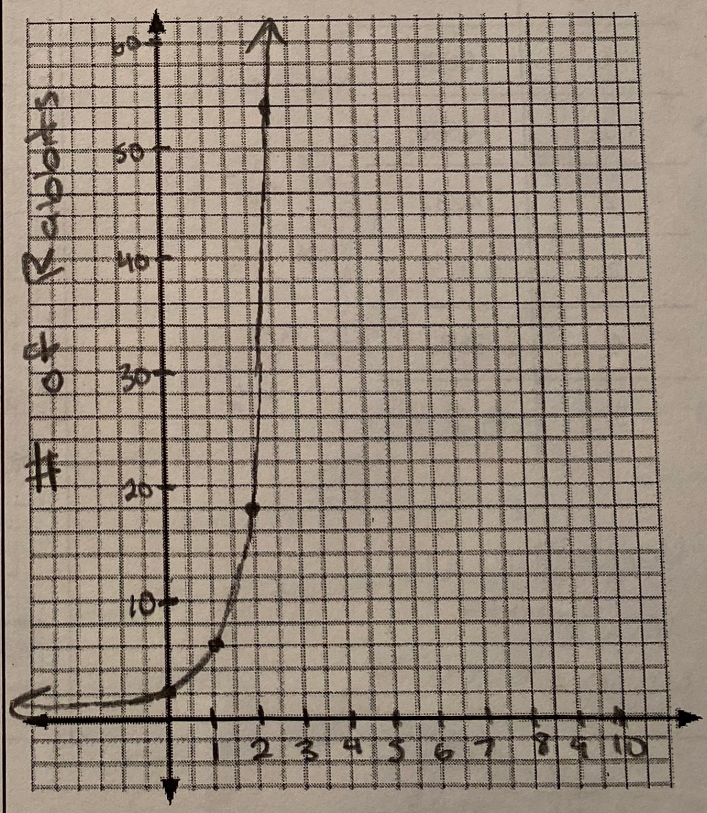
Graph:



# of months since she first got rabbits

Multiple representations of Exponentials

Situation:

In 2019 Ms. Ramer bought a used car: a 2007 Toyota Prius for $5,000.

- The value of the car will depreciate each year by approximately 8%.
- In 2007, the car had a value of $13,599
- If Ms. Ramer keeps her car until 2030, it will be worth about $1,998.
- The graph of this situation has an asymptote. That means that, theoretically, the car will never be zero $.

Equation:

$y = ab^x$

a = initial value
b = multiplier

Define variables:

Let x represent the # of years after Ms. Ramer bought the prius

Let y represent the value of the prius in $

Equation:

$y = 5000(.92)^x$

$y = 5000(.92)^{-12} \approx 13,599$

$y = 5000(.92)^{11} \approx \$1,998.18$

Table:

Time since Purchase (years)	Value of car (dollars)
0	5000
1	4600
2	4232
3	≈3893
4	≈ 3582
5	≈3295

×1, ×1, ×1, ×1, ×1

×.92, ×.92, ×.92, ×.92, ×.92

$y = ab^x$

$y = 5000b^x$

$4600 = 5000 \cdot b^1$

$\frac{4600}{5000} = \frac{5000b}{5000}$

$.92 = b$

Graph: