2.5.A Exponential Function Context and Data Modeling

AP Precalculus Name: _____ **CA #2**

Below is a table of values for exponential functions in the form $f(x) = a(b)^x + k$. Write the equation that represents each table.

1.

x	0	1	2	3	4
$f(x)$	6	18	78	378	1,878

2.

x	0	1	2	3	4
$f(x)$	9	19	39	79	159

3. The table gives the population of mice in a barn after w weeks.

Weeks (w)	3	17	29	45	80
Mouse population (p)	6	9	14	35	350

a. Use an exponential regression $p(w) = ab^w$ to model these data. Round to three decimals but store the original equation in your calculator.

b. According to the model in your calculator, what will the mouse population be after 100 weeks? (round to the nearest whole number)

c. When will there be 2,000 mice? Assume there is no cap on the mouse population, even though that would be unrealistic.

d. When will there be 10,000 mice? Assume there is no cap on the mouse population, even though that would be unrealistic.

4. The table below shows the median home price in Texas for selected values over a 24-month period from January 2021 to December 2022.

Month	2	8	13	18	22
Median home value (dollars)	225,000	255,000	260,000	295,000	300,000

*Not actual data, but this approximates the housing market after the 2020 pandemic in Texas.

a. Use an exponential regression $y = ab^x$ to model these data. Round to three decimals but store the original equation in your calculator.

b. According to the model in your calculator, what was the median value of a home in Texas after 7 months?

c. If the model continued, what would the median value of the homes be 36 months in?

d. During what month was the median value \$270,000?

Answers to 2.5.A CA #2

1. $f(x) = 3(5)^x + 3$	2. $f(x) = 10(2)^x - 1$	3a. $p(w) = 3.771(1.056)^w$ 3b. 839 mice 3c. 116.071 weeks 4d. 145.848 weeks	4a. $y = 221{,}125.124(1.015)^x$ 4b. \$244,793.045 4c. \$373,036.844 4d. $x = 13.747$ 13^{th} month