$\qquad$

|  |  | exponential growth <br> or decay? | growth/decay <br> factor? |
| :--- | :--- | :---: | :---: |
| 1.Ms. Arnold received a job as a teacher <br> with a starting salary of $\$ 55,000$. <br> According to her contract, she will <br> receive a $1.5 \%$ increase in her salary <br> every year. | growth | 1.015 |  |
| 2.A fully inflated raft containing 4500 <br> cubic inches of air loses $6.6 \%$ of its air <br> every day. | decay | 0.934 |  |

3. Camilo purchased a rare coin from a dealer for $\$ 300$. The value of the coin increases $5.5 \%$ each year. Determine the value of the coin in 5 years.

$$
\begin{aligned}
& y=300(1.055)^{5} \\
& y=\$ 392.09
\end{aligned}
$$

4. In a particular state, the population of black bears has been decreasing at the rate of $0.75 \%$ per year. In 1990, it was estimated that there were 400 black bears in the state. If the population continues to decline at the same rate, what will the population be in 2017?

$$
\begin{aligned}
& y=400(0.9925)^{27} \\
& y=326.425 \ldots \quad \text { About } 326 \text { bears }
\end{aligned}
$$

5. Elise is buying a new car for $\$ 42,500$. As time goes by, the value of the car will decrease. Its worth can be estimated using the equation $y=42,500(0.91)^{x}$ in which $y$ represents the value of the car over $\boldsymbol{x}$ years.
a. What is the depreciation rate, $\boldsymbol{r}$, of this particular car? Express your answer as a percent.
9\%
b. Create a table of values that shows the car's value over a period of 20 years.

| Number of Years Passed | Value of the Car <br> (rounded to the nearest dollar) |
| :---: | :---: |
| 0 | $\$ 42,500$ |
| 4 | 29,144 |
| 8 | 19,986 |
| 12 | 13,705 |
| 16 | 9,398 |
| 20 | 6,445 |

c. Using your table of values, create a graph over the interval $0 \leq x \leq 20$.

Think about the scale you will need to create on the $y$-axis in order to graph the function. Make sure to label axes.

d. What will Elise's car be worth after 15 years?

$$
\begin{aligned}
& y=42500(0.91)^{15} \\
& y=\$ 10,327.85
\end{aligned}
$$

e. Estimate how many years it will take for the car to be worth $\$ 5,000$.

| $x$ | $y$ |
| :---: | :---: |
| 22 | 5337 |
| 23 | 4856.7 |

Between 22 and 23 years

