### Lesson 10 Practice Problems

1. A store receives 2,000 decks of popular trading cards. The number of decks of cards is a function, $d$, of the number of days, $t$, since the shipment arrived. Here is a table showing some values of $d$.

| * $t$
 | * $d\left(t\right)$
 |
| --- | --- |
| * 0
 | * 2,000
 |
| * 5
 | * 1,283
 |
| * 10
 | * 823
 |
| * 15
 | * 528
 |
| * 20
 | * 338
 |

* Calculate the average rate of change for the following intervals:
	1. day 0 to day 5
	2. day 15 to day 20
1. A study was conducted to analyze the effects on deer population in a particular area. Let $f$ be an exponential function that gives the population of deer $t$ years after the study began.
* If $f\left(t\right)=a⋅b^{t}$ and the population is increasing, select **all** statements that must be true.
	1. $b>1$
	2. $b<1$
	3. The average rate of change from year 0 to year 5 is less than the average rate of change from year 10 to year 15.
	4. The average rate of change from year 0 to year 5 is greater than the average rate of change from year 10 to year 15.
	5. $a>0$
1. Function $f$ models the population, in thousands, of a city $t$ years after 1930.
* The average rate of change of $f$ from $t=0$ to $t=70$ is approximately 14 thousand people per year.
* Is this value a good way to describe the population change of the city over that time period? Explain or show your reasoning.
* 
1. The function, $f$, gives the number of copies a book has sold $w$ weeks after it was published. The equation $f\left(w\right)=500⋅2^{w}$ defines this function.
* Select **all** domains for which the average rate of change could be a good measure for the number of books sold.
	1. $0\leq w\leq 2$
	2. $0\leq w\leq 7$
	3. $5\leq w\leq 7$
	4. $5\leq w\leq 10$
	5. $0\leq w\leq 10$
1. The graph shows a bacteria population decreasing exponentially over time.
* The equation $p=100,​000,​000⋅\left(\frac{2}{3}\right)^{h}$ gives the size of a second population of bacteria, where $h$ is the number of hours since it was measured at 100 million.
* Which bacterial population decays more quickly? Explain how you know.
* 
* ​​​​​​
* (From Unit 5, Lesson 6.)
1. *Technology required.*A moth population, $p$, is modeled by the equation $p=500,​000⋅\left(\frac{1}{2}\right)^{w}$, where $w$ is the number of weeks since the population was first measured.
	1. What was the moth population when it was first measured?
	2. What was the moth population after 1 week? What about 1.5 weeks?
	3. Use technology to graph the population and find out when it falls below 10,000.
* (From Unit 5, Lesson 9.)
1. Give a value for $r$ that would indicate that a line of best fit has a positive slope and models the data well.
* (From Unit 3, Lesson 7.)
1. The size of a district and the number of parks in it have a weak positive relationship.
* Explain what it means to have a weak positive relationship in this context.
* (From Unit 3, Lesson 8.)
1. Here is a graph of Han’s distance from home as he drives.
* Identify the intercepts of the graph and explain what they mean in terms of Han’s distance from home.
* 
* (From Unit 4, Lesson 6.)



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