CLASS NOTES 7: MODELING

Please read the post our colleague Sean made about his kitty, Ike.

1. What did he mean by the "…when I'm 84" line? How can a cat be 84 years old if he's ***16***?

"Cat years" (and "dog years") are often used to help us understand the ages of our pets relative to their shorter lifespans. For example, Ike up there was 16 when that picture was taken.

2. Do a little Googling and find out how long the "typical" indoor housecat lives.

So Ike there was pretty old, by cat standards. However, Sean claimed he was only 16 "human years" old in that picture. "Cat years" were invented to give us a conversion so that we can talk about the ages of our pets comparatively to our own ages (if we so choose).

A. LeBeau, a French veterinarian, invented a popular "pet age" method in 1953 that, he claimed, worked for cats and dogs:

- **A one-year-old pet has matured at the same level as a 15-year-old human.**
- **At age two, your pet's age equals a 24-year-old person.**
- **Every year after two, add 4 human years to 24. If your pet is 14 or younger, you're done here. If they're older…well, we'll deal with that later.**

Open up this Google sheet! In it, we'll be building a model of cat and dog ages from age 1 year to…well, we'll see how far we go! 🐱🐶

3. Using LeBeau's rules above for cat and dog aging, fill in the columns for "cat years" and "dog years" for aging pets. Note: up to age 14, cat and dog years are the same.

4. To make sure we remember how, let's add a scatterplot of these data to the Sheet!

5. Should we connect the dots with lines? What would the lines represent?

(let's check in with a video here!)

Each of the line segments you just drew has a **slope**. A slope is just a measure of the "tiltedness" of the line. Its formal definition is

$$\textbf{Slope of a line segment} = \frac{\textbf{how many units the line goes up (or down)}}{\textbf{how many units the line goes across}}$$

Another way it's written is

$$\textbf{Slope of a line segment} = \frac{\textbf{"rise" (}\textbf{\textit{or fall}}\textbf{) of line segment}}{\textbf{"run" of line segment}}$$

6. Now, if you look, there are definitely three different slopes for these pet years: the one from year 0 to 1, the one from year 1 to 2, and then the one from year 2 onward. Calculate them all for practice, and check here if you get stuck!

At this point you may (or may not) notice that the slopes you calculated aren't accurately represented on the graph from a visual perspective. For example, the steepest slope you calculated was 15 (from year 0 to year 1). That means that the rise should be 15 times as long as the run is.

7. Is it?

8. Why are they so different?

9. Can you think of a reason the graph was created this way? Am I trying to mislead you intentionally?

(let's check in here again!)

You will often see this kind of thing in your life as you interpret graphical data. For convenience, graph makers will use differently scaled units on the horizontal and vertical axes so that the graph doesn't "stretch out" or "compress" too much. That's helpful – but it also distorts what you're looking at…and that's fine, so long as you realize it!

Now, LeBeau's aging formula gets more interesting after the pet passes 14 years of age. Check it out:

A 15-year-old cat is considered to be 74 where the dog's age goes to 74.5. At 18 years of age, the cat is 80 and the dog is 82. And the 20-year-old cat is 84 and the dog is 87.

10. Let's add those new data points to the sheet; **watch this video** to pick up some new Sheets skills!

11. Now, let's update the chart you made to reflect these new points. **This video will help**!

12. It sure looks like those new points (cat and dog, from years 14 through 20) appear to lie on their own straight lines! Let's add in the other pet years to see if they do!

13. Badass! What are the slopes of those lines?

14. It looks like the slopes you just got are less than any previous slopes you calculated – what must that mean about dog and cat aging after 14 years of age?

One last thing: head back to the beginning of this lab and take a look at that Instagram post.

15. Was the analysis in that post correct? Why or why not?

(one last check in here!)