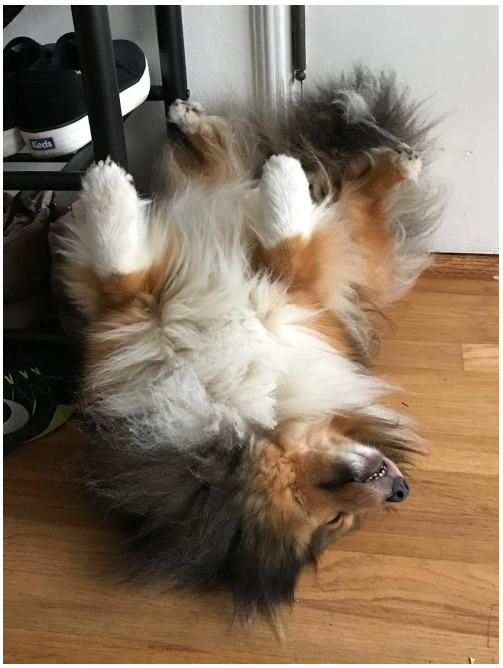
Algebra 1/2 **Day 7: Measuring Variability: Symmetric vs Skewed Distributions** **#7**



Every morning, Mr. Maurer walks his dog, Russet. Here's a picture of the little fluffbutt:

Russet is a good boy, but sometimes he is lazy.

When he's feeling lazy, he likes to roll in the grass.
This makes Mr. Maurer's walk take longer…

Mr. Maurer was curious about how **variable** his morning walks with Russet are.

1. Define the word **variability** in your own words. What statistic did we learn last class to measure **variability?**

2. Mr. Maurer decided to collect some data on his morning walks. Some of his data is missing. Fill in the blanks in the tables below:

Time of Departure	6:15	6:11	6:14	6:12		8:05	8:32
Time of Arrival	6:37	6:35		6:40	6:32		9:35
Duration of Walk (min)	22	24	21		23	44	

Time of Departure	6:10	6:12		6:10	6:13		8:25
Time of Arrival		6:37	6:35	6:33		9:20	9:15
Duration of Walk (min)	25		23		24	62	

3. Mr. Maurer claims there is a regular pattern to his data, and that it makes sense to break the data into two groups. Do you see a pattern yet?

4. Maybe a little more data will help you see the pattern.

Time of Departure	6:12	6:14	6:13		6:18	8:15	8:23
Time of Arrival	6:36		6:40	6:38	6:40	9:03	
Duration of Walk (min)		24		22			55

(Hint: Pay attention to how many days in a row are short walks… how many days are there in each table…. Think about real life… do you do the same thing every day???)

Time of Departure	6:08	6:12		6:13	6:15		
Time of Arrival		6:35	6:40	6:40	6:35	9:25	9:35
Duration of Walk (min)	22		23			55	75

5. In the morning, sometimes Russet likes to roll around in the grass. If Mr. Maurer needs to go to work, he doesn't have time to let Russet roll around. If Mr. Maurer doesn't need to go to work, he can let Russet roll to his little fluffy heart's desire:

Without calculating, estimate the answer to each question below. Explain your reasoning.

   a. Which distribution is more **variable**: the walks during the workweek or the walks during the weekend?

   b. Which distribution has a bigger **measure of center?** Does your answer depend on which of the three measures of center you choose?

   c. Which distribution seems more **symmetric?** Which seems more **skewed**? What direction is the **skew?**

6. **Representing the distributions:** Use the number lines below to draw a **dot plot** AND a **box plot** for the weekend walks and a separate one for the weekday walks. Label your graphs.

Weekday:

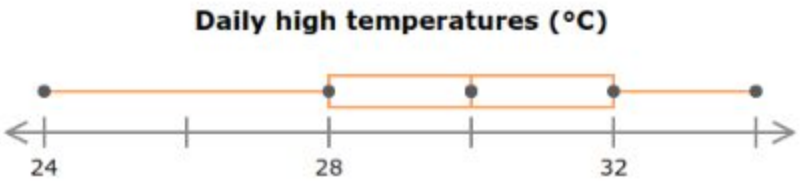
Weekend:

7. **Comparing the centers of the distributions:** Calculate the three measures of center for each distribution and write at least one sentence comparing the two distributions.

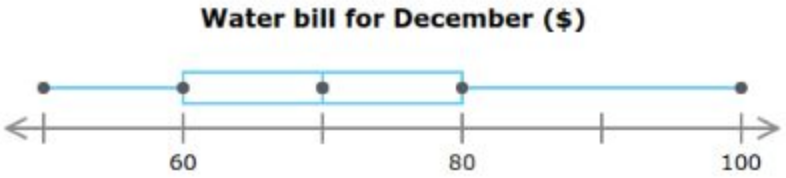
Weekday Walks			Weekend Walks		
Mean	Median	Mode	Mean	Median	Mode
Sentence:			Sentence:		

8. **A new statistical measure: Interquartile Range (IQR).** Interquartile Range is nothing to be scared of. The IQR is the difference of Q3 and Q1. It tells you where the middle 50% of the data lies. You can also think of it as the width of the box on your box-and-whisker plot. **IQR = Q3 - Q1**

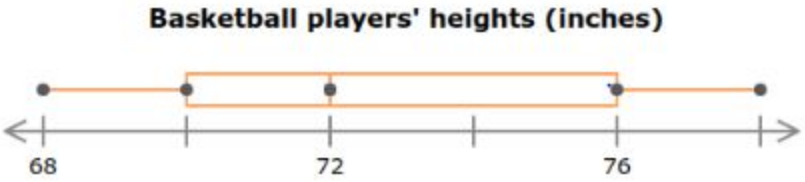
   a. What is the IQR of this distribution?



b. The last distribution had an IQR of 4, because 32 - 28 = 4. This means that 50% of days had a high temperature between 28 and 32 degrees Celsius. What is the IQR of this distribution above?



c. Write a sentence that describes what the IQR tells you about the distribution below.



9. **Comparing the variability of the distributions:** Go back to the weekend walk and weekday walk data. Calculate BOTH measures of **variability** (standard deviation and IQR). Write at least one sentence for each measure that explains what the measures tells you about the distribution.

Weekday Walks		Weekend Walks	
Standard Deviation	Interquartile Range	Standard Deviation	Interquartile Range
Sentence:		Sentence:	

10. Practice: Here's how a class of Mr. Maurer's students did on a quiz. Calculate the three measures of center and the two measures of variability. Write at least two sentences explaining what the different statistical measures tell you about the distribution.

4	4	4	4	3	3	3
3	2.5	2.5	2	2	1	1