Week 1 Wrangle Problems

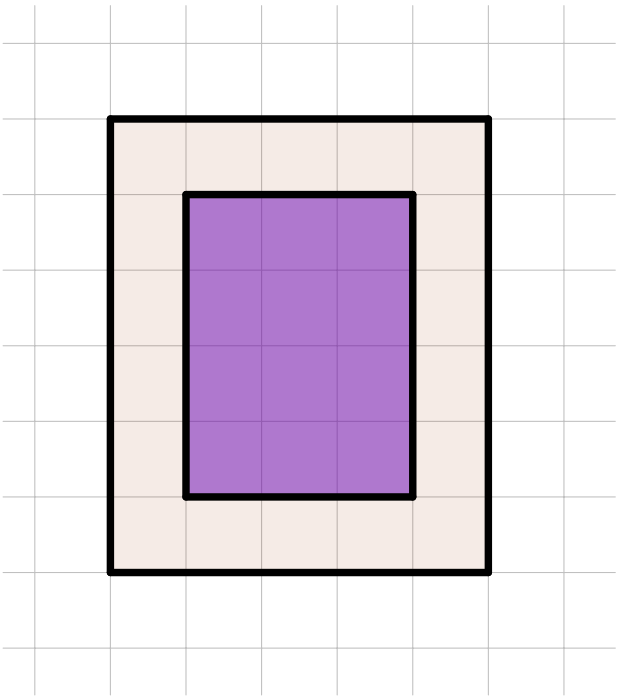
Naayéé' Neeghání (Monster Slayers) vs. Tó'bajíshchíní (Born for Water)

1. One January day, two cars drive on I-40 in opposite directions. Each car drives at a constant speed. One leaves Flagstaff at 11:00 am and arrives in Albuquerque at 4:00 pm; the other one leaves Albuquerque at noon and arrives in Flagstaff at 5:00 pm. When do the cars pass each other?

2. Solve the following cryptarithm:
$$BAA + BAA = EWE.$$

3. What is the value of the sum:
$$1 + 2 + 3 + 4 + \cdots + 98 + 99 + 100 + 99 + 98 + \cdots + 4 + 3 + 2 + 1.$$

4. Using a sheet of grid paper, Dana marked a rectangle and drew a picture inside the rectangle (in the example below it is purple). Then she surrounded the rectangle by a one-square-wide border consisting of grid squares (in the example below it is tan). It turned out that the area of the border is exactly the same as the area of the inside rectangle. What size is the rectangle? List all possible sizes and prove that other sizes won't work. The example below doesn't work.



5. Does there exist a number x such that
$$\sqrt{x+9} + \sqrt{x} + \sqrt{x-9} = 7?$$

6. There is a list of seven numbers. The average of the first four numbers is 5, and the average of the last four numbers is 8. If the average of all seven numbers is $6\frac{4}{7}$, then the number common to both sets of four numbers is...?

Week 2 Wrangle Problems

Naayéé' Neeghání (Monster Slayers) vs. Tó'bajíshchíní (Born for Water)

1. How many spatial diagonals does a buckyball have?
2. Robin purchased four stuffed animals: a rabbit, a teddy bear, a dog, and an elephant. Her purchase without the elephant was \$21. If she had not purchased the teddy bear, she would have paid \$25. The price of the toys without the rabbit was \$29. If she didn't buy the dog, the purchase would have been \$27. How many dollars does each toy cost?
3. How many ways are there to put eight rooks on a chessboard so that they do not attack each other?
4. A box contained 31 chocolates. The first day Susan ate $\frac{3}{4}$ of the number Jacqueline ate. The second day Susan ate $\frac{2}{3}$ of the number that Jacqueline ate that day, and the chocolates were all gone. How many chocolates did Susan eat?
5. A spacemouse, floating through space, finds a $5 \times 5 \times 5$ block of cheese cubes (think of a Rubik's cube made of cheese). If it begins at one of the corner cubes and gobbles up a small cube at a time moving to the next cube of cheese (through a face), can our space mouse end at the cube at the center of our block? (Hint: The block of cheese is made up of swiss cubes and cheddar cubes.
6. In Boomerang Fractions, prove that a fraction of the form $\frac{n-1}{n}$ returns to 1 and find the longevity of some fractions of the form $\frac{n-1}{n}$.
7. A caterpillar crawls up a pole 75 inches high, starting from the ground. Each day it crawls up 5 inches, and each night it slides down 4 inches. When will it first reach the top of the pole?
8. In a certain year there were exactly four Fridays and exactly four Mondays in January. On what day of the week did the 20th of January fall that year?