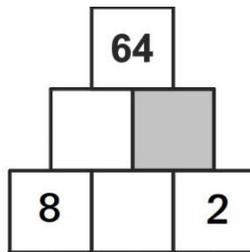Chapel Hill Math Circle
Elementary Group (4-5)
February 27, 2016

1. In a group of 38 students, 20 play soccer, 17 play baseball, and 5 play both. How many students don't play any of those two sports?

2. A very special island is inhabited only by knights and knaves. Knights always tell the truth and knaves always lie. You meet two inhabitants and they make certain statements. Can you determine what they are?

   Marge: Zoey and I are both knights or both knaves.
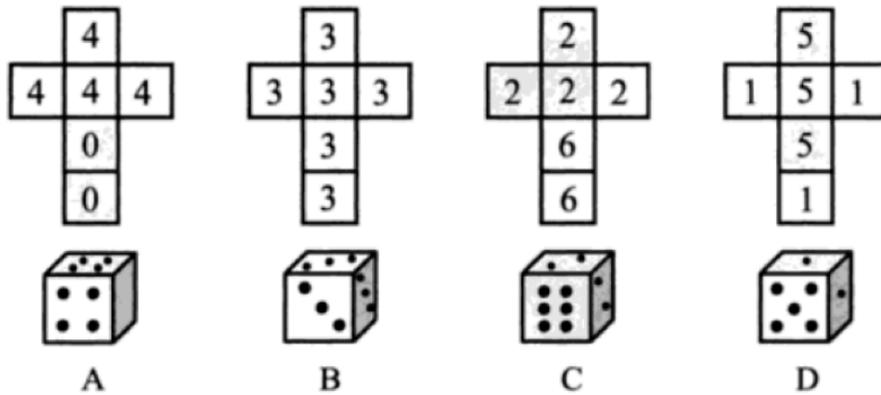   Zoey: Marge and I are the same.

3. Pedro writes numbers in the following diagram such that each number is the product of the two numbers below it. What number should he write in the shaded square?

4. Two turtles are racing each other. It takes 9 hours for the first turtle to crawl 4 meters, and 11 hours for the second one to crawl 5 meters. Which turtle will win the race?

5. Sisters Jane and Jill race for 100 meters and Jane wins by 10 meters. Given that Jane is older, she decides to give Jill an advantage. Jane will start from 10 meters behind the starting line. Assuming that they start at the same time and each runs at the same speed that they did during their first race, what will be the outcome of this race?

Weird Dice

6. Challenge Problem: Consider the unusual numbering system on these dice. You pick one die, and then I will pick another. We will each roll our chosen die and the larger number wins. Do you want to play with me?

4					3					2					5	
4	4	4		3	3	3		2	2	2		1	5	1
0					3					6					5	
0					3					6					1	

    A   B   C   D

7. Extra Challenge: Three dice A, B, and C have the property that A beats B, B beats C, and C beats A all with the same probability. Can you find them?

(From James Tanton: Solve This!)