PUZZLE ZONE

1.There are three houses. One is red, one is blue, and one is white. If the red house is to the left of the house in the middle, and the blue house is to the right to the house in the middle, where is the white house?

2.You are in a cabin and it is pitch black. You have one match on you. Which do you light first, the newspaper, the lamp, the candle, or the fire?

3.Who is bigger: Mr. Bigger, Mrs. Bigger, or their baby?

4.Mike is a butcher. He is 5’10” tall. What does he weigh?

5.A farmer has 17 sheep and all but nine die. How many are left?

6.How far can a rabbit run into the woods?

7.In a year, there are 12 months. Seven months have 31 days. How many months have 28 days?

8.What are the next three letters in the following sequence:

F, M, A, M, J, J, A, __, __, __

9.Jimmy’s mother had four children. She named the first Monday. She named the second Tuesday, and she named the third Wednesday. What is the name of the fourth child?

10.Before Mt. Everest was discovered, what was the highest mountain in the world?

11.Which is heavier? A pound of feathers or a pound of rocks?

12.A family lives in a large tower apartment building, 10 floors high. Every day their son takes the elevator from the family’s apartment on the 10^{th} floor to the ground floor and goes to school. When he returns in the afternoon, he uses the elevator to get to the fifth floor, and then uses the stairs for the remaining five floors. Why?

13.A plane crashes on the border of the U.S. and Canada. Where do they bury the survivors?

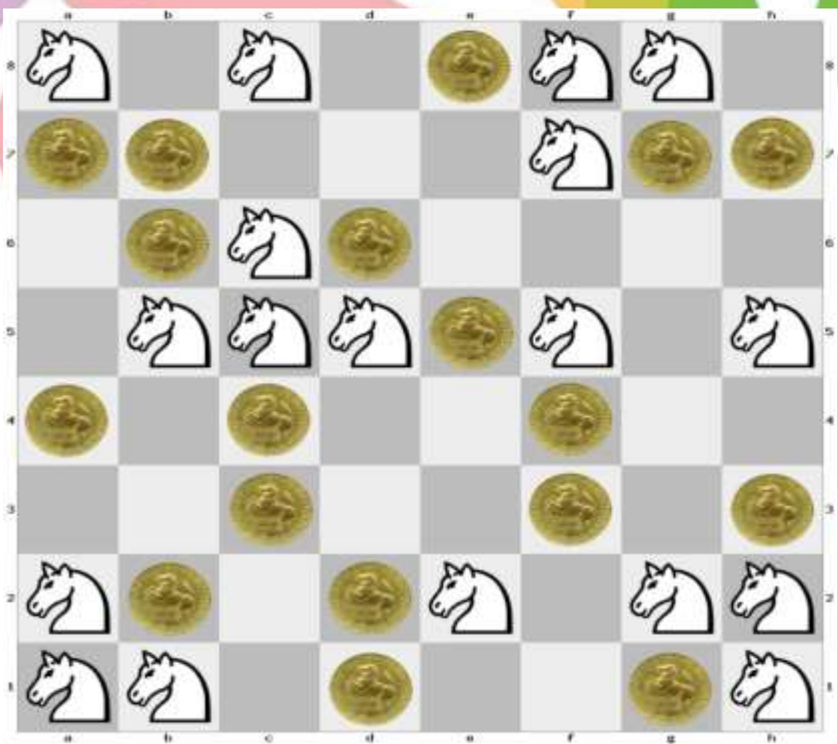
14.I do not have any special powers, but I can predict the score of any football game before it begins. How can I do this?

15.You are driving a bus. At the first stop, two women get on. The second stop, three men get on and one woman gets off. At the third stop, three kids and their mom get on, and a man gets off. The bus is grey, and it is raining outside. What colour is the bus driver's hair?

16. Someone stole gold coins from a museum near the park. No one saw the thief take the coins, so there isn't a description of the robber. Slylock Fox suspects one of the creatures in the park is the thief. Which one?

17. James sent this beautiful photo to a contest, hoping he will win first prize. The contest organizers, however, realized that the photo was fake and disqualified James. How did they figure out the picture was not real?

18. Bob and Jane are taking turns, placing knights and coins respectively on a chessboard. If Bob is allowed to place a knight only on an empty square which is not attacked by another knight, how many pieces at most can he place before running out of moves? Assume that Jane starts second and plays optimally, trying to prevent Bob from placing knights on the board.



19. What number corresponds to 1985?

0 0 0 0 – 4
1 7 5 2 – 0
1 8 7 9 – 3
2 0 6 1 – 2
3 1 4 1 – 0
4 0 9 6 – 3
7 7 7 7 – 0
9 9 7 3 – 2
1 9 8 5 – ???

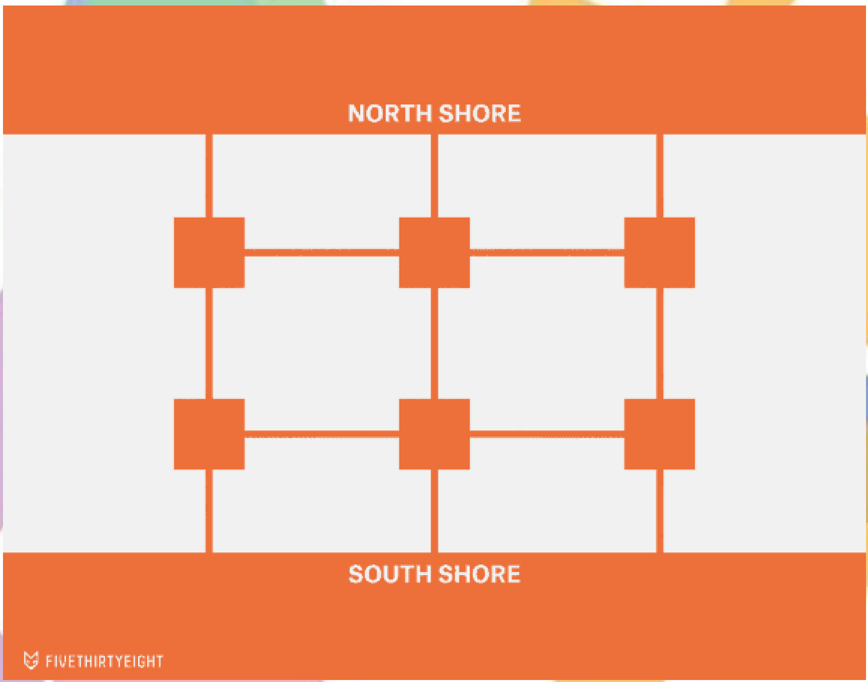
20. You have 10 strings of noodles left on your plate. You randomly start tying up their ends, until there are no loose ends anymore. What is the average number of loops which are created?

21. The number 2^{29} has 9 digits, all different. Which digit is missing?

Bonus: Is the number 9991 prime?

22. Borromean rings are rings in the 3-dimensional space, linked in such a way that if you cut any of the three rings, all of them will be unlinked (see the image below). Show that rigid circular Borromean rings cannot exist.

23.You need to cross a river, from the north shore to the south shore, via a series of 13 bridges and six islands, which you can see in the diagram below. However, as you approach the water, a hurricane passes and destroys some (possibly none/all) of the bridges. If the probability that each bridge gets destroyed is 50%, independently of the others, what is the chance that you will be able to cross the river after all?



24. Somehow you end up in a room which has three doors. Behind the first door, there is deadly poisonous gas. Behind the second door, there are trained assassins with knives. Behind the third door, there are lions which have not eaten in years. Which door would you choose to open?

25. There are only two barbers in one town. One of the barbers has a neat haircut and a clean working place. The other barber's haircut is a total mess and his working place is dirty. Which barber would you choose to give you a haircut and why?

26. Researches have discovered a strong positive correlation between performance in spelling bees and contestants' shoe sizes. Can you find an explanation for this?

27. The police found a murdered man in a car. The windows of the car were raised, the doors were locked, and the keys were

inside, in the man’s hands. The man was shot several times with a gun, but there were no holes anywhere on the car. How is this possible?

28. A perfectly symmetrical square 4-legged table is standing in a room with a continuous but uneven floor. Is it always possible to position the table in such a way that it doesn’t wobble, i.e. all four legs are touching the floor?

29. There are 100 prisoners in solitary cells. There is a central living room with one light bulb in it, which can be either on or off initially. No prisoner can see the light bulb from his or her own cell. Everyday the warden picks a prisoner at random and that prisoner visits the living room. While there, the prisoner can toggle the light bulb if he wishes to do so. Also, at any time every prisoner has the option of asserting that all 100 prisoners already have been in the living room. If this assertion is false, all 100 prisoners are executed. If it is correct, all prisoners are set free.

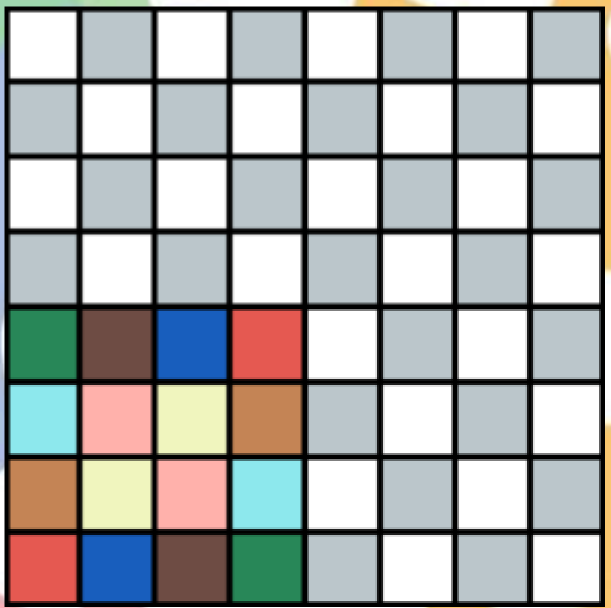
The prisoners are allowed to get together one night in the courtyard and come up with a plan. What plan should they agree on, so that eventually someone will make a correct assertion and they will be set free?

30. In how many equal pieces can you cut a round cake using only 3 slices?

ANSWERS

1. In Washington, D.C.!
2. You light the match first!
3. The baby, because he is a little bigger.
4. Meat
5. Nine
6. Halfway. After that, he is running out of the woods.
7. They all do.
8. S, O, N. The sequence is first letter of the months of the year. September, October, and November are the next in the sequence.
9. Jimmy, because Jimmy's mother had four children!
10. Mt. Everest. It was still the highest in the world. It just had not been discovered yet!
11. Neither. Both weigh a pound!
12. Because he cannot reach the buttons higher than five.
13. You do not bury the SURVIVORS!
14. Well, the score before any football game is always zero to zero!
15. Whatever colour your hair is! Remember, you are the bus driver!
16. The raccoon on the seesaw couldn't hold the heavier bear off the ground unless he was carrying something heavy. Since gold is one of the heaviest metals, Slylock suspects the raccoon is the thief and has hidden the coins in his clothes.
17. There are stars over the moon, which is impossible.
18. Bob can place at most 16 knights. One way to do this is to keep placing knights only on the 32 white squares. In order to see that Jane can prevent Bob from placing more than 16 knights, split the board in four 4×4 grids. Then, group the squares in each grid in pairs, as shown on the image below. If Bob places a knight on any

square, then Jane will place a coin on its paired square. This way Bob can place at most one knight on each of the four red squares, one knight on each of the four green squares, one knight on each of the four brown squares, and one knight on each of the four blue squares. Therefore, he can not place more than 64/4 = 16 knights on the board.



19. The numbers on the right count the total number of “holes” in the digits on the left. “1”, “2”, “3”, “4”, “5” and “7” have 0 holes in them. “0”, “6” and “9” have 1 hole in them. “8” has 2 holes in it. Therefore the missing number is 2.

20. The expected (average) number of loops at the end of the procedure is equal to the expected number of loops created after the first tying, plus the expected number of loops created after the second tying, etc. After each tying, the number of non-loop strings decreases by 1, and then the probabilities to create a new loop are 1/19, 1/17, 1/15, etc. Therefore, the answer is the sum 1/19 + 1/17 + 1/15 + … + 1/3 + 1/1 ~ 2.1.

21. Let the missing digit be **m**. Every number and the sum of its digits give the same remainder when divided by 9. The

number $2^{29} = 32 * 64^4$ gives remainder 5 when divided by 9, and therefore 9 divides $(0 + 1 + 2 + \ldots + 9) - 5 - m = 40 - m$. Thus, the missing digit is 4.

Bonus: $9991 = 10000 - 9 = 100^2 - 3^2 = (100 - 3)(100 + 3) = 97 * 103$. Therefore the number 9991 is not prime.

22. Assume the opposite. Imagine the rings have zero thickness and reposition them in such a way, that two of them, say ring 1 and ring 2, touch each other in two points. These two rings lie either on a sphere or a plane which ring 3 must intersect in four points. However, this is impossible.
23. Imagine there is a captain on a ship, who wants to sail through the river from West to East. You can see that he will be able to do this if and only if you are not able to cross the river. However, if you rotate the diagram by 90 degrees, you can also see that the probability that you cross North-South is equal to the probability that he sails West-East, and therefore both probabilities are equal to 50%.
24. You should open the door with the lions. If they have not eaten in years, they will be dead already.
25. You should choose the second barber. Since there are only two barbers, the chances are that they give each other haircuts. Also, probably the second barber's salon is dirtier because he has lots of work and does not have time to clean up properly.
26. Older students have bigger feet and perform better at spelling bee contests.
27. The car was convertible, with the top retracted back.
28. The answer is yes. Let the feet of the table clockwise are labeled with 1, 2, 3, 4 clockwise. Place the table in the room such that 3 of its feet – say 1, 2, 3, touch the ground. If foot 4 is on the ground, then the problem is solved. Otherwise it is easy to see that we can not put it there if we keep legs 2 and

3 on the same places. Now start rotating the table clockwise, keeping feet 1, 2 and 3 on the ground at all times. If at some point foot 4 touches the ground as well, the problem is solved. Otherwise continue rotating until foot 1 goes to the place where foot 2 was and foot 2 goes to the place where foot 3 was. Foot 3 will be on the ground, but this contradicts the observation that initially we couldn't place legs 2, 3 and 4 on the ground without replacing feet 2 and 3.

29. First the prisoners should elect one of them to be a leader and the rest – followers. The first two times a follower visits the living room and sees that the light bulb is turned off, he should turn it on; after that he shouldn't touch it anymore. Every time the leader visits the living room and sees that the light bulb is turned on, he should turn it off. After the leader turns off the lightbulb 199 times, this will mean that all followers have already visited the room. Then he can make the assertion and set everyone free.

30. Eight pieces. Cut the cake into four identical pieces with two vertical slices and then make a third horizontal slice through the center.


Thank you!