



Grade 6 Math Circles

Fall 2012

Logic Problems

Solutions

1. It was a boy, his father and his grandfather.
2. We know that the person wearing the pink shirt (who assured Miss Yellow she was correct) must be Mr Blue since it cannot be Mrs Pink. Then there are only the blue and yellow shirts remaining. Therefore, Mrs Pink was wearing the yellow shirt (since Miss Yellow cannot wear that one) and Miss Yellow is wearing the blue shirt.
3. Bella has 0 pens.
4. Since it is noon now, then 36 hours from now will be midnight. Therefore it will not be sunny in 36 hours.
5. The order, from top to bottom, is: Chocolate, Vanilla, Cookie Dough, Bubblegum and Strawberry.
6. You should ask one of the men, “Which way would the other guy tell me to go?”, and then go the opposite way. The man is either telling the truth about a lie or lying about the truth. So, go the other way!

7. Player A is wearing a white helmet. Here’s why.
If A’s helmet were white, B would see C’s blue helmet, and see A’s white helmet. So B would not be able to figure out their helmet colour. There is the same reasoning for C. If A’s helmet were blue, B would see C’s blue helmet, and A’s blue helmet. B’s helmet could still be either blue or white. There is the same reasoning for again. So Sage B and C cannot speak up for sure.

After a while, when Player A sees that neither Player B or Player C speak up, (and they speak up if they could solve the riddle), Player A reasons that neither Player B nor Player C, based on what they see, can deduce the color of their own helmets. So he must be the only one who can figure it out.

So what does Player A see? Two blue helmets (B’s blue helmet and C’s blue helmet). So Player A again reasons correctly that only he sees two blue helmets. Since sage B’s hat is blue and sage C’s hat is blue, Sage A correctly reasons that his own helmet cannot be blue. (Or else all three sages would see the other two sages wear blue helmets).

So A’s helmet must be white, and so A speaks up.

8. He said “I will have to write 1000 lines.” If he was lying, he’d have to write 1000 lines. But that’s what Jordan is saying. So he speaks the truth. But if he speaks the truth, then he should be serving detention. Therefore, it is impossible to determine whether Jordan is telling the truth or not. So, he is set free.
9. You should cut the cake in 4 (by cutting an 'X') and then cut it horizontally.
10. The only lockers that remain open are perfect squares (1, 4, 9, 16, etc) because they are the only numbers divisible by an odd number of whole numbers; every factor other than the number’s square root is paired up with another. Thus, these lockers will be ”changed” an odd number of times, which means they will be left open. All the other numbers are divisible by an even number of factors and will consequently end up closed.
- So the number of open lockers is the number of perfect squares less than or equal to 1000. These numbers are 1^2 , 2^2 , 3^2 , 4^2 , and so on, up to 31^2 . (32^2 is greater than 1000, and therefore out of range.) So the answer is 31.
11. Fred weighs 120 pounds, Frank weighs 240 pounds and Finnigan weighs 360 pounds.

12. Halloween Treats

Name	Costume	Treats
Boris	Werewolf	48
Glen	Ghost	37
Jessie	Wizard	42
Selina	Pumpkin	25
Trish	Witch	31

13. Einstein’s Riddle

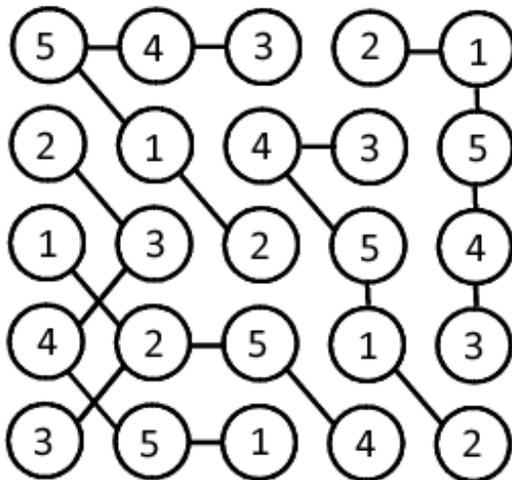
				
Norwegian	Danish	British	German	Swedish
Water	Tea	Milk	Coffee	Juice
Lacoste	Nike	Adidas	Quick Silver	Calvin Klein
Cat	Horse	Bird	Fish	Dog

14. Sudoku

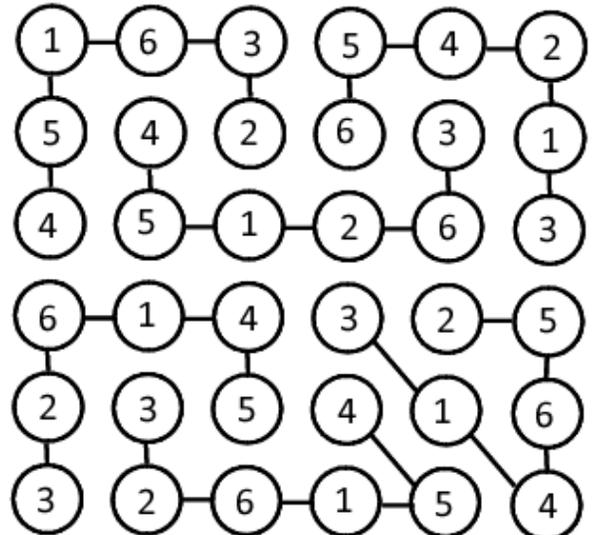
1	4	5	7	8	9	6	3	2
7	9	3	5	6	2	4	1	8
2	6	8	3	4	1	5	7	9
9	5	2	4	1	6	3	8	7
4	3	7	9	5	8	1	2	6
8	1	6	2	3	7	9	5	4
5	8	9	6	7	3	2	4	1
3	2	1	8	9	4	7	6	5
6	7	4	1	2	5	8	9	3

15. Solve the following Strimko puzzles:

(a) Medium level



(b) Hard level



16. Solve the following Calcudoku puzzles:

(a) Easy level

10+ 5	3	5+ 1	4	7+ 2	6 6
10+ 6	2	11+ 5	3 3	4	1
4 4	9+ 5	6	4+ 1	3	5+ 2
9+ 1	4	5+ 2	11+ 6	5	3
2 2	6	3	6+ 5	1	4 4
4+ 3	1	6+ 4	2	11+ 6	5

(b) Hard level

2- 4	1080× 2	3	14+ 5	1	6 6
2 2	6	19+ 1	4	3	5
6 6	5	4	60× 3	2	1 1
3 3	4	6	1	23+ 5	2
7+ 1	3	5	2	6	7+ 4
5 5	1	2	6	4	3