

2006 Mixed Team Competition Answers

1. The first student is correct. (There can only be three flowers.)
2. They can do it in 17 minutes. First the 1 minute and 2 minute people should cross, with the 1 minute person coming back. Then the 5 minute and 10 minute people should cross, with the 2 minute person coming back. Finally the 1 minute and 2 minute cross for a total of $2+1+10+2+2=17$ minutes.
3. It seems that all of the 31-day months should tie but remember that we end daylight savings time in October, so October is 1 hour longer.
4. The second rumor is true. There are an infinite number of members.
5. Yes: Since Guido has shaved someone, everybody shaves Guido, including Lorenzo. Again since Lorenzo shaves someone, everybody shaves Lorenzo, including Petruccio.
6. \$39 (Five 7's and One 4, OR Eight 4's and One 7)
7. \$67 (Five 7's and Eight 4's, Nine 7's and One 4, OR Fifteen 4's and One 7)
8. 45
9.
 - (a) No. If an inhabitant is a knight, he would not lie and claim to be a knave. If the habitant is a knave, he would not truthfully admit to being a knave.
 - (b) Yes (Only in the case where he is knave and his brother is a knight.)
 - (c) A is a knight; B is a knave.
 - (d) B must be a knave. If A is a knight then the statement is true so B must be a knave. If A is a knave then the statement is false then B must be a knave because if B were a knight then the statement would be true, and we just said that it was false.
10.
 - (a) No. If the defendant were Arthur York then he would be a knight, which would mean that his first answer to Craig were true, which means that he, Arthur York, claimed he was a knave.

- (b) No. If the defendant is a knight then his answers to both questions would be truthful. In his second answer, he claimed that he was not Arthur York. Since he is knight, he must be telling the truth. On the other hand, if is a knave, then both of his answers are lies. In particular, his answer to the first question is false, and he did once claim to be Arthur York. But since he is a knave, this claim is a lie. Thus he is not Arthur York.
- (c) Yes. Suppose the defense attorney is a knight. Then the defendant is a knave. So the defendant's statement is false, which means the defense attorney is a knave, which is impossible since a person cannot be both a knave and a knight. Therefore the defense attorney must be a knave. So the defendant must be a knave because he claimed that his attorney always tells the truth. Thus both the defendant and the attorney are knaves. Now if the defendant is *not* Arthur York then the defense attorney made a true statement when he said that his client was a knave but not Arthur York. This is impossible since the defense attorney is a knave. Therefore the defendant is Arthur York.

11.

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