

# BONUS QUESTIONS

For credit on a bonus question turn in a written sheet with your name, course number, ID, and the solution - including your explanation. Deadline is April 12.

1. Determine the next number in the sequence: 7 8 5 3 9 8 1 6 3
2. A magic trick done this semester asked someone to pick a number between 100 and 999 (not a palindromic number that reads the same forwards and backwards), then reverse the digits and subtract the smaller of the two numbers from the larger. Then turn to this page in The Complete Sherlock Holmes book, then take the last digit of the page and count down that many lines. Finally, give the first two words of the line. From this the magician is able to recite the entire sentence containing those two words. Give a full (mathematical) explanation of how this can be done.
3. Another magic trick this semester had someone pick three integers between 0 and 10, then add them and put the sum in a circle. Next take 12 times the first number, add the second, multiply by 10, and finally add the number originally put in the circle. The answer is told to the magician, who then is able to say what all three original numbers were. Give a full (mathematical) explanation of how this can be done.
4. Four friends, call them A,B,C,D, are on one side of a river and have a single boat to cross to the other side. The boat can only hold two people. Each friend has a crossing time, A is 1 minute, B is 2, C is 5, and D is 10. If two passengers are in the boat then the crossing time is that of the slower passenger. Explain how A,B,C,D can all get to the other side of the river in total time 17 minutes. [This question was given on a job application examination by Microsoft.]
5. One hundred wine tasters meet in a hotel in southern France for a convention. The owner of the hotel wants to see how good they are, so all 100 are seated at a table and blindfolded. The owner tells them “each of you has four glasses of wine in front of you, an 1890 Chardonnay, a 1900 Burgundy, a 1911 Chablis, and a 1932 Riesling. Your task is to identify them by tasting them.”

The results were as follows. No-one got all four wrong, i.e. every taster got at least one correct. The number that got exactly one correct was 50, and the number that got exactly two correct 25. The number that got all four correct was half the difference between 50 and twice the number that got exactly three correct.

Question: how many got exactly three correct? [Given on a scholarship examination for Oxford Univ.]