

Mathematics Challenge for the Term

For this term we present you a single two-part Challenge of the Term

PROBLEM #1:

Andy, Bogdan, Charles, and Gregory played soccer in the school's backyard. Suddenly one of them kicked the ball into a building's window and broke it. The local policeman asked each boy, "Who broke the window?" All but Gregory answered "Not me!" Gregory replied "I don't know." It turned out later that two boys told the truth and the other two lied.

- (a) Did Gregory tell the truth?
- (b) Did Gregory break the window?

Provide a justification for your answers.

PROBLEM #2:

In Europe, students' grades are recorded on a numerical scale: 5, 4, 3, and 2 (instead of the respective letters A, B, C, and D). Over a two-term course, a student received a great many grades – homework, quizzes, tests etc. – but she was not sure how many items there actually were. She did know, however, that there were fewer than 100 grades for the course. When she asked her instructor how well she was doing, she was told exactly one third of all her grades were 3's, exactly one quarter were 4's, and exactly one fifth were 5's. She was a bit perplexed by this response but her instructor assured her it contained enough information for her to compute her average score, presuming all items received the same weight. Was the instructor correct? If not, provide at least two different sets of scores which satisfy all the conditions. If this is enough information, determine how many 2's she scored and her average for the course. Be sure to fully justify your answer.

Provide a justification for all your possible answers.

*Direct any questions to
Peter Andrews (OM 3361) or Grant Lakeland (OM 3630)*

Rules & Rewards

- Any undergraduate currently enrolled at EIU is eligible to participate.
- Each solution is to be the work of one individual and is to be submitted with the solver's name, year in school, email address, local address, and home address.
- Each solution is to be written or typed and is due in the main Mathematics Department office (OM 3611) by 4:00pm, Friday, December 9, 2016.
- Entries will be judged on the basis of clarity of exposition and elegance of the solution. That is to say, the *explanation* is more important than the answer.
- You may present solutions to one or both of the problems
- An award of \$50 will be given for the best overall solution(s).
- Names of all solvers will be posted on the Challenge of the Week bulletin board and on the Challenge of the week homepage: <http://www.eiu.edu/math/challenge.php>