

# Mathematics Competition

*April's fools Problem #3 - April 1 to April 10, 2015*

1. The picture on the back side shows that one of the six parking space numbers is covered by a car. What is the missing parking space number under the car? **Justify your answer.**
2. Put 6 unsharpened pencils on the table so that every pencil touches every other one in at least one point. **Justify your answer.**
3. If you divide a cylindrical birthday cake by making exactly 4 cuts with a sharp knife, what is the maximal number of pieces you can get? **Justify your answer.**
4. Which number is bigger,  $A$  or  $B$ , and what is the ratio of the larger to the smaller? **Justify your answer.**

$$A = \left(\frac{1}{2} - \frac{1}{3}\right) \cdot \left(\frac{1}{4} - \frac{1}{5}\right) \cdot \left(\frac{1}{6} - \frac{1}{7}\right) \cdot \dots \cdot \left(\frac{1}{96} - \frac{1}{97}\right) \cdot \left(\frac{1}{98} - \frac{1}{99}\right);$$

$$B = \left(\frac{1}{1} - \frac{1}{2}\right) \cdot \left(\frac{1}{3} - \frac{1}{4}\right) \cdot \left(\frac{1}{5} - \frac{1}{6}\right) \cdot \dots \cdot \left(\frac{1}{97} - \frac{1}{98}\right) \cdot \left(\frac{1}{99} - \frac{1}{100}\right).$$

5. Two non-congruent isosceles triangles have the same base angles and share a common side. How can this happen and what are the angles of each triangle? **Justify your answer.**

*Direct any questions to Gregory Galperin, OM 3361.*

## 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 2:00pm, Friday, March 27, 2015.
- 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.
- An award of \$25 will be given for the best solution. In the case of a two-way tie, the award will be evenly split. If there are more than two 'best' solutions, a drawing will be held for the reward. In the case no award is made for this week's challenge, \$25 will be added to the next week's award.
- 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>



What is the missing parking space number under the car?