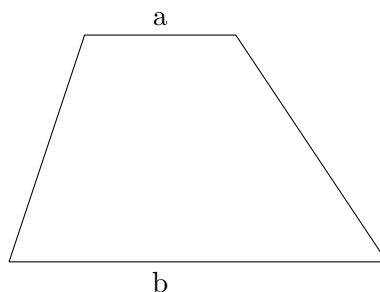


University Math Challenge

March 2, 2020 to March 27, 2020

PROBLEM 2

Two pirates are trying to divide their looted treasure between them. They want to split a gold bar in the shape of a trapezoid $ABCD$ with two parallel sides of lengths $BC = a$ and $AD = b$, where $a < b$, and the other two sides are not parallel. The pirates want to split the bar with one cut MN , parallel to the two parallel sides BC and AD , so that the trapezoid is divided into two trapezoids of equal area.



Let x be the length of the cut MN .

- (a) When $a = 6$ and $b = 8$, what is x ?
- (b) When $a = 7$ and $b = 17$, what is x ?
- (c) For any a and b , what is x in terms of a and b ? Justify your answer.

Direct any questions to
Grant Lakeland (OM 3226) or 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, 2020.
- 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 \$50 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, \$50 will be added to the next week's award.
- Names of all solvers will be posted on the Challenge of the Month bulletin board and on the Challenge homepage: <http://www.eiu.edu/math/challenge.php>