University Math Challenge

March 25, 2025 to April 18, 2025

PROBLEM # 2

(1) If $A = 101001000100001$, is there a positive integer B so that the product AB contains no zero digits in its decimal representation? Explain your answer.

(2) If $X = 11111...1111$ (one hundred digits, all 1), what are the first 20, and last 10, digits of the decimal representation of the number X^2? Justify your answer.

Direct any questions to
Grant Lakeland (OM 3226)

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, April 18, 2025.
- 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 $100 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, $100 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`