



## **GALLOP ROUND RULES**

1. The Gallop Round will consist of 24 questions to be solved in 60 minutes.
2. The questions will be divided into 8 sets of 3 questions each, and you ***must submit the answers to one set*** before accessing the problems for the next. This means you must strategize when to submit each set (incomplete or not) to ensure you get access to as many questions as possible.
3. Once you submit the answer form for one of the sets, the password for the next set will be on the form submission screen, so make sure you note it down, otherwise you may waste valuable time getting the password from us!
4. The problems will get progressively more difficult, and later problems will be worth more points.
5. Submissions will be scored immediately and a live score of all participating teams will be available during the competition. Prepare for the adrenaline rush!

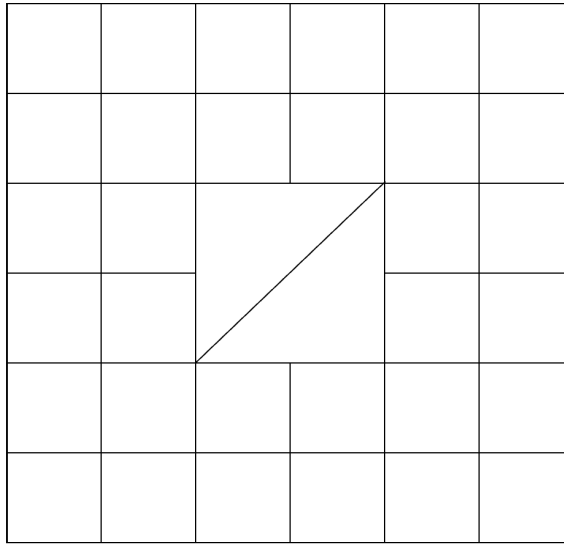
# GALLOP SET 7

21 points per question

[Gallop Set 7 Answer Submission Form](#)

[Gallop Live Scores](#)

19. An adventurous mustang begins at the bottom left of the shown grid. If the mustang can only move up and to the right along the shown lines, how many different paths can the mustang take to the top right corner?



20. Sebastian has matching outfits where each consists of a hat, pants, a shirt, and a pair of socks, all of the same color (boring but useful in math problems). He has four of these sets, in colors of red, blue, green, and yellow. If he randomly picks a hat, pants, a shirt, and a pair of socks out of his drawer, what is the expected number of matching pairs of clothing pulled? Express your answer as a simple common fraction. (Note: If he pulls an entire outfit - 4 items of the same color - then he would have 6 matching pairs of clothing).
21. The Martians use a strange numbering system that only requires two digits, but many different numerals. The number  $NK$  in the martian system is  $K + (K + 1) + \cdots + (K + N - 1)$  in base ten. When  $1 \leq N \leq 1984$  and  $2 \leq K \leq 1984$  are positive integers. What is the smallest base ten number greater than 1984 that the Martians cannot represent?