

Junior Circle 2, Problem Set 22

1. A goat is tethered by a rope to a corner of a rectangular barn. The rope length is 7 yards, and the barn is 9 by 5 yards. Draw the grazing area of this goat. (Please use graph paper: make a drawing that is not only correct, but also neat and to scale.)



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2. How many five-digit numbers are there so that:
- Its leftmost digit is even
 - Its thousands' digit is odd
 - Its hundreds' digit is prime (can't be divided by any number other than 1 and itself)
 - The tens' and ones' digits are identical?

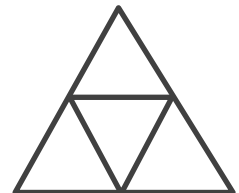
3. Ali, Barry, and Connie have lots of goldfish. When they add the numbers of their goldfish two at a time, they got 19, 21, and 24. What is the largest number of goldfish they could have?



4. Try to devise a system of ropes and pegs that will keep a goat in a semicircle.



5. You are playing a board game. Your 4 triangular kingdoms are located as shown on the picture to the right. At the start of the game, the wealth of each of your kingdoms is 0. On each turn you can select two kingdoms **sharing a stretch of a common border**, and increase the wealth of each of these kingdoms by 1. Is it possible to increase each kingdom's wealth to the amounts shown on each of the pictures below?



If it is possible, show the sequence of turns that would get you there. If not, explain why.

