Problems of the Month

April 2016

General Problem:

Alice and Bob are both going to a concert. The concert starts at 8pm and is 20 miles away. Alice leaves at 6:30pm on her bicycle, riding at 12mph. Bob leaves at 7:45pm and drives a car at 55mph. Who gets to the concert first, and at what time?

Calculus Problem:

You are on a date on the other side of a circular swamp when you realize it's time to head home.
(It wasn't always circular, but the county designated the circle as protected wetlands, and the rest was developed leaving a circular swamp with a radius of 1 mile)

- You can hike through the swamp at 2 miles per hour.
- You can walk along the perimeter road at 2.5 miles per hour.

Because you don't want the date to end too soon, you want to find the longest route home that won't make your date suspicious. As such you'll walk along the perimeter of the swamp for a ways, then cut through the swamp for the last stretch. This is shown as the dotted line on the diagram.
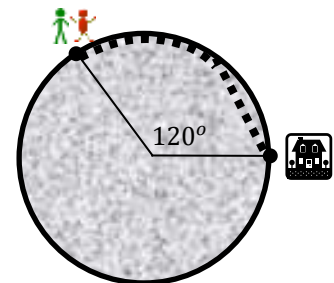
Where should you cut through the swamp to maximize your travel time?

Challenge Problem:

Up to rotation, how many different ways are there to color the vertices of a pentagon so that no two adjacent vertices are the same color? Assume you have seven colors to choose from.