

HOMework/PROBLEMS 8

MAT160: Mathematical problems and games.
Spring 2005

03/29/2005. Due on 04/05/2005

Instructions: As usual, think about all problems, and come up with some ideas about how to solve them.

1. Your favorite math teacher, say Professor X , is hanging out on a heavily forested island that is really narrow: it is a narrow strip of land that is ten miles long. Let us label one end of the strip A , and the other end B . A fire has started at A , and the fire is moving toward B at the rate of 1 mph. At the same time, there is a 2 mph wind blowing in the direction from A toward B . What can X do to save himself? Assume that X cannot swim and there are no boats, jetcopters, teleportation devices, etc.. (if he does nothing, X will be toast after at most 10 hours, since 10 miles / 1 mph = 10 hours).

2. You have two hourglasses: a 7 minute one and an 11 minute one. Using just these hourglasses, accurately time 15 minutes.

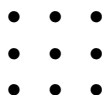
3. You have a round birthday cake. With three straight slices of a knife, divide the cake into 8 equal pieces.

4. A dragon and knight live on an island. This island has seven poisoned wells, numbered 1 to 7. If you drink from a well, you can only save yourself by drinking from a higher numbered well. Well 7 is located at the top of a high mountain, so only the dragon can reach it.

One day they decide that the island isn't big enough for the two of them, and they have a duel. Each of them brings a glass of water to the duel, they exchange glasses, and drink. After the duel, the knight lives and the dragon dies.

Why did the knight live? Why did the dragon die?

5. You have 9 dots arranged like a rectangle:



Without lifting your pen, draw four lines that cross all 9 dots.