

Homework:

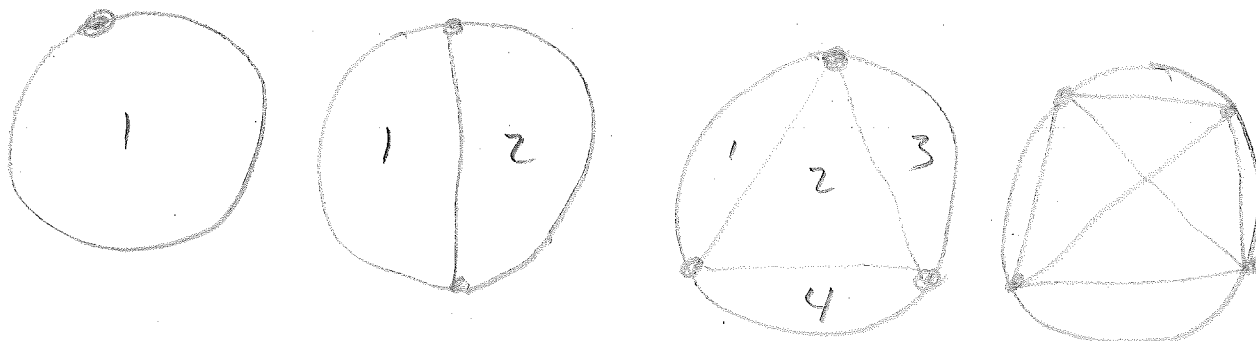
DUE IN CLASS Tuesday Sept 19

Instructions: No late homework will be accepted. Your home work must be on one side of one or two pieces of paper (if two, then stapled in the upper left corner). Your name and discussion section time must be in the upper left corner of the first page. Typing is best, but extremely neat writing is acceptable. Write in clear, complete sentences. For some problems the answer will be one short sentence. For some it will take a paragraph—the answer is NEVER just a word or number.

PROBLEM 1: Mathematicians are sometimes cruelly stereotyped as being obsessive-compulsive since they demand that statements they accept as fact come with a “proof”. We will discuss what a proof is in class. The rest of the world does not hold to this high a standard, and all sorts of problems result.

Consider the following: If you draw a circle, you have enclosed one region. If you put two points on the circle and connect them with a segment, there are now two regions (see pictures below). If you have three points on the circle and you connect every pair of points with a segment, you have four regions.

- a.) If you have four points on the circle and connect every pair with a segment, how many regions do you have?
- b.) If you have five points on the circle and connect every pair with a segment, how many regions do you think you will have? Draw the picture and count—does this confirm your prediction?
- c.) What is the general pattern? If you have N points on the circle and connect every pair with a segment, how many regions do you think you will have?
- d.) If you have six points on the circle and connect every pair with a segment, how many regions do you think you will have? Draw the picture and count—does this confirm your prediction?
- e.) Show this to someone NOT enrolled in this class (your roommate, another student—anybody NOT in this class). Did they make the same prediction you did? (I won't encourage you to gamble, but could you have won a bet with them?) Were they surprised when you showed them the next step...



PROBLEM 2: The notion of proof is very useful—it is useful to be sure that a statement is true. However, to have a proof of a statement, you have to be absolutely sure what the statement says and means. This, sadly, is not what happens in everyday life. All around us we see misunderstanding because people don't think carefully about what they say. I overheard the following conversation on the T:

Person 1: If you respected me you would always be on time. You were late this morning, so you don't respect me.

Person 2: But I was on time yesterday, so I do respect you.

Irrespective of what you think the relationship is between being on time and respect, which of these people is making a correct argument and what is wrong with the argument of the other person?

PROBLEM 3: Another conversation I heard on the T:

Person 1: The teacher said we had to do all the homework to get an A in the class. I did all the homework, but still I got a B...don't you think that is unfair?

Person 2: Well I got 95's on both tests in that class, but I still didn't get an A. Isn't that unfair?

Irregardless of how you think grades should be determined, was the teacher unfair to either student above? Why or why not?

PROBLEM 4: One more thing I overheard on the T:

Person 1: Have you met John, he is seven feet tall and kind of a jerk.

Person 2: Yes, you are right. You know, he is the only person I've met that is seven feet tall, so I'm convinced all people that tall are jerks.

What is wrong with Person 2's argument. (Note: This seems silly, but, sadly, too many people make this error too often.)