

Department of Mathematics
Maths 190 and Maths 190G Assignment 1
Due 4pm, Friday March 9, 2007

Your completed assignment should be placed in the appropriate box outside the Student Resource Centre in the basement of the Maths building before 4pm on the due date. Late assignments or assignments placed in the wrong box will not be marked. Your assignment must have a blue Mathematics Department coversheet. Copies of the coversheet are available from a box outside the Student Resource Centre.

Marks will be awarded for this assignment based on the **clarity** of your answers. You should aim for well-written, polished answers. The markers will not be concerned with spelling and grammar but will pay close attention to the **logic** of your statements. You may find it helpful to get someone who is not taking this course to read your answers to check that your explanations are clear and logically sound.

You may discuss your attempts to answer the questions with other members of the class. However, you should write up your answers yourself (do not copy from another person or allow another person to copy from you). If you worked with someone on your answers, state who you worked with.

If you need help with this assignment, first read the text book. Note that some hints for solving the Mindscapes below are contained in the text, starting on page 32. If you need further help once you have read the text book, speak to your lecturer.

1. **Politicians on parade** (Mindscape 2, Chapter 1 of text) There were 100 politicians at a certain convention. Each politician was either crooked or honest. We are given the following two facts:

- a. At least one of the politicians was honest.
- b. Given any two of the politicians, at least one of the two was crooked.

Can it be determined from these facts how many of the politicians were honest and how many were crooked? Explain your answers.

2. **The profit** (Mindscape 3, Chapter 1 of text). A dealer bought an item for \$7, sold it for \$8, bought it back for \$9, and sold it for \$10. How much profit did she make?

3. **The cannibals and the missionaries** (Mindscape 8, Chapter 1 of text). In 1853 in the wilds of Tasmania, three missionaries and three cannibals were walking in a group. The missionaries were trying to convert the cannibals to their religion, while the cannibals were looking for a chance to practice their culture on the missionaries. After a time, they all came to a river that they wished to cross. None of the six could swim, but all could row. Fortunately, on the river bank was a small rowboat available for use.

Since the boat was small and the cannibals and the missionaries were all on the large side, it was clear that only two persons could cross at one time. It was late in the day and neither cannibals nor missionaries had eaten much recently, and the missionaries began to notice that the cannibals were indicating greater and greater appreciation for the

missionaries' ample girths. The missionaries decided that being prudent was better than being a main course, so they agreed that at no time would they allow any group of missionaries to be outnumbered by cannibals during the crossing. For their part, the cannibals did not fear being outnumbered by the missionaries because they realized that an excess of missionaries would result only in more discussion among the missionaries thus relieving the cannibals of the burden of polite conversation.

How do the cannibals and the missionaries all cross the river using only the one boat while at no time letting the cannibals outnumber the missionaries on either side of the river?

4. Getting a pole on a bus (Mindscape 12, Chapter 1 of text). For his 13th birthday, Bill was allowed to travel down to Alison's Sporting Goods store to purchase a brand new fishing pole. With great excitement and anticipation, Bill boarded the bus on his own and arrived at Alison's store. Although the collection of fishing poles was tremendous, there was only one pole for Bill and he bought it: a 5-foot, one-piece fiberglass "Trout Troller 570" fishing pole.

When Bill's return bus arrived, the driver reported that Bill could not board the bus with the fishing pole. Objects longer than 4 feet were not allowed on the bus. Bill remained at the bus stop holding his beautiful 5-foot Trout Troller. Alison, who had observed the whole ordeal, rushed out and said, "We'll get your fishing pole on the bus!" Sure enough, when the same bus and the same driver returned, Bill boarded the bus with his fishing pole, and the driver welcomed him aboard with a smile. How was Alison able to have Bill board the bus with his 5-foot fishing pole without breaking or bending the bus-line rules or the pole?

Tutorial write-up: Remember to hand in with your assignment your written solution to the boxed Mindscape in Tutorial 1, which you would have discussed already during the tutorial. Instructions on how to write up tutorial questions are contained on the tutorial sheet.