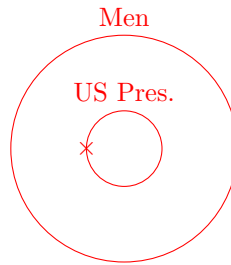# MATH 1030: Homework 3

due January 27, 2012

Instructions: Do the following problems on a separate sheet of paper. Show all of your work.

§1D Exercise 28

This is by nature somewhat subjective, but most people would agree that Bach, Buxtehude, Beethoven, Brahms, Berlioz, and Britten are in fact great composers. This argument is weak because there have been many composers throughout history whose names have started with the letter "B." Certainly not all of them were great composers.

§1D Exercise 32

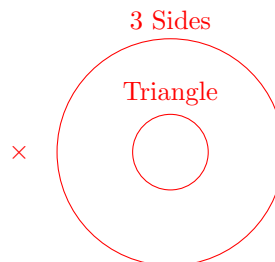   a. The first premise is already in the required form.

   b.

     This argument is not valid, because saying that George Washington was a man does not imply that he was president.

   c. The premises are true, but the argument is not valid, so it is not sound.

§1D Exercise 41

   a. The first premise is already in the required form.

   b. This is a deductive argument. The first premise is a general statement about all triangles. The argument is valid because the premises follow from the conclusion. We can see this with a venn diagram:

The × represents all squares. Since squares have four sides, they do not have three sides. Triangles are a subset of the things with three sides, so the × could not possibly go in the circle representing triangles.

c. The premises are true, and the argument is valid so it is also sound.

§1D Exercise 48

We define "p"="taxes are cut," "q"="the U.S. government will have less revenue," and "r"="the deficit will be larger." Then the argument has the form

Premise #1:	If p, then q.
Premise #2:	If q, then r.
Conclusion:	If p, then r.

This is a valid argument.

§1D Exercise 50

First, you should try to get a feel for whether or not this might be true. Try plugging in some numbers. How about $a = 0$, $b = c = 2$. Then we get

$$\frac{a}{b+c} = \frac{0}{2+2} = \frac{0}{4} = 0 \qquad \text{and} \qquad \frac{a}{b} + \frac{a}{c} = \frac{0}{2} + \frac{0}{2} = 0$$

It worked!! Now let's try another, say $a = b = c = 1$. If we plug it in, we have

$$\frac{a}{b+c} = \frac{1}{1+1} = \frac{1}{2} \qquad \text{and} \qquad \frac{a}{b} + \frac{a}{c} = \frac{1}{1} + \frac{1}{1} = 2$$

but $\frac{1}{2} \neq 2$, so we found a set of numbers a, b, c where the equation doesn't hold. So it is not true for all nonzero real numbers.

§1D Exercise 51

Similar to the last problem, we should test it out to get a feel for whether it may be true or not. Let's try $a = b = 1$. Is it true that $\sqrt{1+1} = \sqrt{2} \overset{?}{=} \sqrt{1} + \sqrt{1} = 1 + 1 = 2$. Well, $\sqrt{2} \approx 1.41 \neq 2$, so it is not true.

Problem 1

Determine whether the following arguments are inductive or deductive. If the argument is inductive, is it a weak or strong argument? If the argument is deductive, is the argument valid or invalid? If the deductive argument is valid, is it sound? Justify all of your answers.

	Premise #1:	Tough gangs get articles written about them in the newspaper.
(a)	Premise #2:	There is an article in the newspaper about the Orphans.
	Conclusion:	The Orphans are a tough gang.

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	Premise #1:	The Boppers, the Hi-hats, the Moonrunners, the Jones-Street Boys, and the Hurricanes are influential gangs.
(b)	Premise #2:	Many gangs, including the Boppers, the Hi-hats, the Moonrunners, the Jones-Street Boys, and the Hurricanes attended the big meeting.
	Conclusion:	All influential gangs attended the big meeting.

	Premise #1:	None of the Warriors had ever been to the Bronx before.
(c)	Premise #2:	Luther had been to the Bronx before.
	Conclusion:	Luther is not a Warrior.

	Premise #1:	The Warriors are good with any weapons – "real good."
(d)	Premise #2:	Swan is good with any weapon.
	Conclusion:	Swan is a Warrior.

a. This is a deductive argument. It is not valid. Just because there is an article in the paper about the Orphans does not mean that they are a tough gang. For example, there could be an article about Barack Obama. Does that mean he is a tough gang?

b. This is an inductive argument. Whether it is weak or strong is subjective. I gave credit for either answer, as long as you wrote some justification.

c. This is a deductive argument. It is valid because the conclusion follows from the premises. If we assume that the premises are true, then Luther could not be a Warrior because if he was, then he would be a Warrior who had been to the Bronx before. But one of the premises is that none of the Warriors had been to the Bronx before. If you had watched the movie like I suggested, you would know that this argument is sound. I gave credit either way.

d. This is a deductive argument. It is not valid. What if the second premise said, "Chuck Norris is good with any weapon." Does that imply that Chuck Norris is a Warrior? The point is that there are people who are good with any weapon that are not Warriors.