GENERAL INSTRUCTIONS FOR WRITTEN HOMEWORK AND EXAMS

This sheet gives general instructions for written homework in N. C. Phillips' classes with numbers less than 300. The examples in it are taken from Math 112 and Math 251, but similar examples could be provided for any other course. Much of what is here is standard, but some is not, so please read through it once. Except where obviously inapplicable, these instructions also apply to all exams.

Notation mistakes common to the particular course you are taking can be found on the website for that course.

(1) You are encouraged to work together to understand the material and understand how to do the problems. However, you must turn in your own assignment; you may not simply copy from someone else's paper or from the back of the book. If you work together with others, you **must** write on the top right of your paper (below your own name) the names of any other people you worked with on the assignment.

(2) If you want to write notes on your homework paper, keep a copy and write your notes on that. If you want to use your homework to study for an upcoming exam or quiz, please copy it before turning it in. (Homework graders often take a week or even more to return homework.)

(3) Write neatly, put the problems on your paper in the same order that they appear in the assignment (even if you don't do them in that order), and start all problems at the left margin of the paper. All homework papers must be on standard $8\frac{1}{2} \times 11$ inch paper. (I do not mind if homework is done on the back of good quality paper that has been used on one side.) If you use more than one page, your pages must be stapled together. Do **not** fold or tear the corners. Do **not** fold the papers in half lengthwise.

(4) Unlike in WeBWork, **final answers must always be simplified unless otherwise stated.** This applies on all exams! For example, common factors must be cancelled from fractions, terms containing common factors must be combined, like terms in polynomials must be combined, constants must be combined,

expressions like $\sin(0)$, e^0, $\ln(1)$, etc. must be evaluated, etc. It does *not* mean that denominators must be rationalized, that products must be multiplied out (often the factored form is simpler), or that numerical expressions must be evaluated using the calculator.

Here are some examples of expressions that must be simplified:

$$\ln(e^x),\ \ \sin(\pi/2),\ \ \frac{2x+4}{x+2},\ \ \frac{2x^3}{x^4},\ \ x^2 + 3x^2,\ \ 2(x+6) + x(x+6)$$

Here are some examples of expressions that may be left as they are:

$$\frac{1}{\sqrt{2}},\ \ (x-2)(x+5),\ \ e^{1/2},\ \ 5700 \cdot e^{\frac{27}{10}\ln\left(\frac{130}{57}\right)}$$

(5) *Show your work* (but don't turn in scratchwork).
(6) *Your work should be mathematically correct, for the same reason that assignments in a writing class should use correct spelling and grammar.* (Also note that computers and calculators are very picky about notation.) It should also include enough words to explain what you are doing. You are trying to communicate something (we are, after all, giving partial credit if some of your work is correct), so you should ensure that what you say is what you mean.

Consider the following solutions to the problem of finding $\log_2(1/8)$:

Good:

Let $x = \log_2(1/8)$. Then $2^x = 1/8$. So $x = -3$.

Fair:

$$\log_2(1/8) = x \implies 2^x = 1/8 \implies x = -3.$$

Poor:

$$\log_2(1/8) \implies 2^x = 1/8 \implies x = -3.$$

Poor:

$$\log_2(1/8),\ \ 2^x = 1/8,\ \ x = -3.$$

Wrong:

$$\log_2(1/8) = 2^x = 1/8 = x = -3.$$

The first is what the solution should look like. The second is also acceptable. The third and fourth are not very good, because the third does not say what x is, and the fourth does

not say how the steps are related. The fifth contains a number of *false* statements (for example, $1/8$ is certainly not equal to -3), and will be graded accordingly.

Here are some other common errors.

The parentheses in the following expressions are *required*; the expression is wrong (or changes its meaning) if they are left out:

$$2 \cdot (-x), \quad a(b+c), \quad a - (b+c), \quad 1/(2+x), \quad (2+x)/7.$$

In particular, in fractions, parentheses are required except when the fraction line is exactly horizontal.

Use of mixed fractions: $2\frac{1}{2}$ will be read as $2 \cdot \frac{1}{2} = 1$, not $2 + \frac{1}{2}$. Write $2 + \frac{1}{2}$ if that is what you mean.

Writing two operation symbols next to each other. Standard conventions don't allow expressions like $2 + -7$ or $2 \cdot -x$. Use parentheses.

Use of $\times$ as a multiplication symbol. In handwritten work, it is too easily read as x.

Use of certain calculator or computer expressions in written work. For example, the expressions

$$\text{1.37E12}, \qquad \lim_{x \to 0} 1/x = \text{DNE}, \qquad \text{and} \qquad \lim_{x \to 0} 1/x^2 = \text{INFINITY}$$

are valid in certain calculators and computer systems, but not in written work.

More examples of incorrect notation will probably be provided with your course. **Read them!**

(7) On graphs, label the axes, give some indication of the scale on each axis, label the x and y intercepts whenever it is clear what they are, and label the curves if there is more than one. If the problem says to plot the graph by hand, give some indication of what points you used (such as a small table).

(8) Use correct units. If the correct answer is 1.37 months, then an answer of 1.37 years is wrong, and will be graded as wrong. If the problem asks for the population of a city, then an answer of 1.37 million years is certainly wrong, and will be graded as wrong.

(9) Give calculator approximations to at least 3 significant digits, and don't round intermediate results. (All calculators have memories, so you don't have to reenter intermediate results.)

(10) If you use a result from a problem you already did, say where you got it.

(11) If a problem says to do something with your calculator, show what you got. (No credit will be given for the answer "done".)