Math 30
Post Class Interview: Following Quarter

1. What math classes are you in this quarter? If you are not in any math courses are you in any courses that require problem solving? How are you doing in those classes?

2. i. Describe the kinds of problems that you are required to do in your current class(es). Provide some examples: Are the problems that you are required to do in your current class(es) more like exercises that can be done by imitating problems illustrated by the instructor/TA or do you have to do novel problems that are that are unllke any that you have previously seen?
ii. Describe the type of learning that goes on in your current classes. Is there opportunity to be actively involved in these classes?

3. Describe the extent to which you think the following was emphasized and in what ways during Math 30 as an approach to problem solving:

i. Orient yourself to the problem/understand what is given or assumed and what is to be found/proved.
ii. Devise a plan
iii. Carry out the plan
iv. Look back and check your results

4. What general things (as contrasted with particular problem solving techniques) did you learn about problem solving in Math 30?

5. i. Do you recall learning about any of the following approaches to problem solving in Math 30. Describe where did the learning take place: During whole group discussion, within groups, indirectly while working on a problem, or other. If possible, please provide an example.

relax conditions
try a simpler problem
try to relate it to a similar problem
specialize
generalize
work backwards
establish subgoals
other

ii. Have you had an opportunity to use these approaches in subsequent courses in mathematics? Give examples.

6. What specific techniques/problem solving methods do you recall learning in Math 30? Could you give an example of a problem for each type?

7. Have you made any use of these techniques in your current classes? Give examples:

8. In what ways, if any, do you find yourself actively "monitoring" your think, that is, reflecting on what you are thinking and doing and evaluating your choices when solving a problem?

9. To what extent do you think Math 30 gave you a chance to engage in "math talk." How did this experience contrast with

i. Previous courses:
ii. Current courses:

10. Do you think the opportunity to discuss mathematics in Math 30 helped you to

i. Learn new concepts
ii. Learn new techniques
iii. Learn new strategies
iv. Reinforce previous knowledge/techniques/strategies.

In each instance could you illustrate or provide an example and explain in what ways these have occured

11. Has your confidence in your own abilities to do mathematics changed? If so, in what ways?

12. Describe in what ways, if any, Math 30 may have to contributed to a new view of yourself as a learner and doer of mathematics.

13. i. Here are some problems. What would be your first intuition as to the most likely technique or problem solving method:

a. What is the value of

$$\frac{1}{2!} + \frac{2}{3!} + \frac{3}{4!} + \ldots + \frac{n}{(n+1)!}?$$

b. 16 men and 14 women are sitting at a circular table. Prove that there are two men who are sitting exactly opposite each other.

c. Integers are placed at the vertices of a 20-gon. You can perform any sequence of the following moves: choose an edge and add one to each of the vertices on the edge. Can you make all the integers divisible by 3?

d. Let $f : \mathbb{R}^2 \to \{1, 2, 3, 4\}$ be a function. Prove that there exists rectangles such that f is constant on its vertices.

e. The integers $1, 2, 3, \ldots, 64$ are placed on a regular chessboard. Prove that there must be two neighbors which differ by at least 9.

ii. What elements in the problem, if any, lead you to come to these conclusions.

a.

b.

c.

d.

e.

Work out loud on the following problem(s)

I. Intergers are placed in each entry of a 10×10 table with no two neighboring entries differing by more than 5 (two squares of the table are neighbors if they share an edge). Prove that two of the integers must be equal.

II. Find all solutions in integers to the equation

$$a^2 + b^2 = 3(c^2 + d^2)$$