

Math 30 Problem Solving Initial Survey and Quiz

_____PERSONAL IDENTIFIER
(CHOOSE YOUR OWN AND RECORD IT)

Please answer the following questions. I do not require your identity and the answers will be kept anonymous.

1. What is your major?
2. What are your reasons for taking this course?
3. Describe your learning goals for this class.
4. Describe your interest in mathematics. For example, does mathematics have independent interest for you or only practical interest? If your interest is practical, for example, because of its applications in your major, it can nonetheless be significant or it could be minimal. Please describe the intensity of your interest in mathematics.
5. Describe your understanding of what mathematics is about? In particular, what does the statement "To do mathematics" mean to you?
6. What university level mathematics courses have you taken so far (indicate if taken as AP, at another institution, or at UCSC).
7. Choose one of these courses that you think was especially effective in terms of your own learning and indicate three aspects of the teaching of that course that you think contributed to that experience. If you have not taken university level mathematics than use high school courses to answer questions 7–10.
8. Please elaborate in greater detail about the factor among those listed in question five that most contributed to the success of your learning.
9. Choose one of the courses from question six in which you were, overall, dissatisfied with your experience and indicate three aspects of the teaching of that course that you think detracted from effective learning.
10. Please elaborate in greater detail about the factor among those listed in question seven that most contributed to your dissatisfaction with your own learning in this course.
11. Please respond to the following statement: "Doing well in mathematics depends on innate ability; you can either do mathematics or you can't and no amount of hard work will make a difference."
12. What do you think of as a "mathematical problem"?
13. Respond to the following statement: "If you are going to solve a mathematical problem then the solution will become evident in a few minutes. After that it is a waste of time to keep trying."
14. What terms would you use to describe yourself as a learner?
15. How would you characterize your arithmetic skills without a calculator? Circle all those that apply: strong, fast, accurate, automatic, nearly perfect but I

have to think about each problem, I always make lots of mistakes, other (indicate in the space below).

16. How would you characterize your algebraic skills without a calculator? Circle all those that apply: strong, fast, accurate, automatic, nearly perfect but I have to think about each problem, I always make lots of mistakes, other (indicate in the space below).

17. Have you had occasions to solve novel problems, i.e. a problem that your teacher had not already demonstrated how to solve? If so, describe one such problem.

18. Have you ever been a course in which there were mathematical proofs? If so, describe the course(s).

19. Have you ever kept a journal in a class? In a mathematics class? Briefly describe.

20. Have you ever participated in a mathematics contest? If so, please indicate which ones.

21. In the following list place a C next to each term or phrase that you are **CERTAIN** that you understand, place a T next to those that you **THINK** you understand and a N next to those that you are **NOT** certain that you understand.

- a) the natural numbers
- b) the integers
- c) the rational numbers
- d) the real numbers
- e) the complex numbers
- f) set
- g) union of two sets
- h) intersection of two sets
- i) relation on a set
- j) equivalence relation on a set
- k) a permutation of a set
- l) combination of m objects chosen from a set of n objects
- m) partition of a set
- n) function
- o) mathematical induction
- p) mathematical proof
- q) pigeon-hole principle
- r) invariance principle
- s) Cartesian product
- t) coordinate plane
- u) an ordered pair
- v) function
- w) onto function
- x) one-to-one function
- y) for a natural number m congruence modulo m
- z) generating set
- aa) recurrence relation

- bb) prime number
- cc) unique factorization of integers
- dd) Fibonacci sequence
- ee) difference equation
- ff) Pascal's triangle
- gg) relatively prime integers
- hh) division algorithm for integers
- ii) Euclidean algorithm for integers
- jj) Catalan numbers
- kk) graph
- ll) arithmetic progression
- mm) geometric progression
- nn) countable set

22. Pick one thing from the list above that you are certain you understand and describe what it means to you and how you think about it.

23. Explain why you cannot divide by 0.

24. Solve the following equations:

a) $3X - 2 = 7$

b) $4X + 3 = 9$

c) $\frac{2}{5} = \frac{5}{7} + \frac{2}{3}A$

d) $\pi X + 3.8 = \pi^2 X - \sin 14$.