

Do You Have Math Anxiety?

A Self Test



(1) = Disagree, (5) = Agree.

1. I cringe when I have to go to math class. **1 2 3 4 5**
2. I am uneasy about going to the board in a math class. **1 2 3 4 5**
3. I am afraid to ask questions in math class. **1 2 3 4 5**
4. I am always worried about being called on in math class. **1 2 3 4 5**
5. I understand math now, but I worry that it's going to get really difficult soon. **1 2 3 4 5**
6. I tend to zone out in math class. **1 2 3 4 5**
7. I fear math tests more than any other kind. **1 2 3 4 5**
8. I don't know how to study for math tests. **1 2 3 4 5**
9. It's clear to me in math class, but when I go home it's like I was never there. **1 2 3 4 5**
10. I'm afraid I won't be able to keep up with the rest of the class. **1 2 3 4 5**



- 40-50** Sure thing, you have math anxiety. Check my 10 hints on how to reduce math anxiety.
30-39 No doubt! You're still fearful about math.
20-29 On the fence!
10-19 Wow! Loose as a goose!

Math anxiety is an emotional reaction to mathematics based on a past unpleasant experience which harms future learning. A good experience learning mathematics can overcome these past feelings and success and future achievement in math can be attained.

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Math Anxiety: What is it?

Anxiety about performing well in math or math-based science courses is a common experience for many college students. Research has indicated that approximately 30% of college students struggle with math anxiety, and that this issue has consistently ranked among the top 20 concerns for college students.

Math Anxiety: What are the symptoms?

Coping With Math Anxiety

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A famous stage actress was once asked if she had ever suffered from stage-fright, and if so how she had gotten over it.

normal. Alarming, many school teachers – even those whose job it is to teach mathematics – communicate this attitude to their students directly or indirectly, so that young people are invariably exposed to an anti-math bias at an impressionable age.

It comes as a surprise to many people to learn that this attitude is not shared by other societies. In Russian or German culture, for example, mathematics is viewed as an essential part of literacy, and an educated person would be chagrined to confess ignorance of basic mathematics. (It is no accident that both of these countries enjoy a centuries-long tradition of leadership in mathematics.)

Our jaundiced attitude towards mathematics has been greatly exacerbated by the way in which it has been taught since early in this century. For nearly seventy years, teaching methods have relied on a behaviorist model of learning, a paradigm which emphasizes learning-by-rote; that is, memorization and repetition. In mathematics, this meant that a particular type of problem was presented, together with a technique of solution, and these were practiced until sufficiently mastered. The student was then hustled along to the next type of problem, with its technique of solution, and so on. The ideas and concepts which lay behind these techniques were treated as a sideshow, or most often omitted altogether.

The mind is not a vessel to be filled. It is a fire to be kindled.

– Plutarch

Someone once described this method of teaching mathematics as inviting students to the most wonderful restaurant in the world – and then forcing them to eat the menu! Little wonder that the learning of mathematics seems to most people a dull and unrewarding enterprise, when the very meat of the subject is boiled down to the gristle before it is served.

This horror story of mathematics education may yet have a happy ending. Reform efforts in the teaching of mathematics have been under way for several years, and many – if not all – teachers of mathematics have conscientiously set about replacing the behaviorist paradigm with methods based on constructivist or other progressive models of learning. As yet, however, there remains no widely accepted teaching methodology for implementing these reform efforts, and it may well be that another generation will pass before all students in the primary and secondary grades are empowered to discover the

Students must learn that mathematics is the most human of endeavors. Flesh and blood representatives of their own species engaged in a centuries long creative struggle to uncover and to erect this magnificent edifice. And the struggle goes on today. On the very campuses where mathematics is presented and received as an inhuman discipline, cold and dead, new mathematics is created. As sure as the tides.

– J.D. Phillips

range and beauty of mathematical ideas, free of the stigmas engendered by social and educational bias.

Finally, young women continue to face an additional barrier to success in mathematics. Remarkably, even at the start of the 21st century, school-age girls are still discouraged by parents, peers, and teachers with the admonition that mathematics “just isn’t something girls do.” Before we became teachers, we would have assumed that such attitudes died out a generation ago, but now we know better. Countless of our female students have told how friends, family members, and even their junior and senior high school instructors impressed upon them the undesirability of pursuing the study of mathematics. My own wife (a mathematician) recalls approaching her junior high school geometry teacher after class with a question about what the class was studying. He actually patted her on the head, and explained that she “didn’t need to know about that stuff.” (And, needless to say, he didn’t answer her question.) Rank sexism such as this is only part of the problem. For all adolescents, but especially for girls, there is concern about how one is viewed by members of the opposite sex – and being a “geek” is not seen as the best strategy. Peer pressure is the mortar in that wall. And parents, often even without knowing it, can facilitate this anxiety and help to discourage their daughters from maintaining an open mind and a natural curiosity towards the study of science and math.

Together these social and educational factors lay the groundwork for many widely believed myths and misconceptions about the study of mathematics. To an examination of these we now turn.

M **M** **MS** **S**

A host of common but erroneous ideas about mathematics are available to the student who suffers math anxiety. These have the effect of justifying or rationalizing the fear and frustration he or she feels, and when these myths are challenged a student may feel defensive. This is quite natural. However, it must be recognized that loathing of mathematics is an emotional response, and the first step in overcoming it is to appraise one’s opinions about math in a spirit of detachment. Consider the five most prevalent math myths, and see what you make of them:

Myth #1: Aptitude for math is inborn.

This belief is the most natural in the world. After all, some people just are more talented at some things (music and athletics come to mind) and to some degree it seems that these talents must be inborn. Indeed, as in any other field of human endeavor, mathematics has had its share of prodigies. Karl Gauss helped his father with bookkeeping as a small child,

and the Indian mathematician Ramanujan discovered deep results in mathematics with little formal training. It is easy for students to believe that doing math requires a math brain, one in particular which they have not got.

10's place! But are you building bridges, or studying mathematics? Even if you are studying math so that you can build bridges, what matters right now is understanding the concepts that allow bridges to hang magically in the air – not whether you always remember to carry the 2.

That you be methodical and complete in your work is important to your math instructor, and it should be important to you as well. This is just a matter of doing what you are doing as well as you can do it – good mental and moral hygiene for any activity. But if any instructor has given you the notion that “the right answer” is what counts most, put it out of your head at once. Nobody overly fussy about how his or her bootlace is tied will ever stroll at ease through Platonic Realms.

Myth #5: Men are naturally better than women at mathematical thinking.

If there is even a ghost of a remnant of a suspicion in your mind about gender making a whit's difference in students' mathematics aptitude, slay the beast at once. Special vigilance is required when it comes to this myth, because it can find insidious ways to affect one's attitude without ever drawing attention to itself. For instance, I've had female students confide to me that – although of course they do not believe in a gender gap when it comes to ability – still it seems to them a little unfeminine to be good at math. There is no basis for such a belief, and in fact a sociological study several years ago found that female mathematicians are, on average, slightly more feminine than their non-mathematician counterparts.

Sadly, the legacy of generations of gender bias, like our legacy of racial bias, continues to shade many people's outlooks, often without their even being aware of it. It is every student's, parent's, and educator's duty to be on the lookout for this error of thought, and to combat it with reason and understanding wherever and however it may surface.

Across the centuries, from Hypatia to Amalie Nöther to thousands of contemporary women in school and university math departments around the globe, female mathematicians have been and remain full partners in creating the rich tapestry of mathematics. For outstanding web sites with information about historical and contemporary women in mathematics, check

Okay, so what is the constructive way to manage math anxiety? I call it “taking possession.” It involves making as conscious as possible the sources of math anxiety in one’s own life, accepting those feelings without self-criticism, and then learning strategies for disarming math anxiety’s influence on one’s future study of mathematics. (These strategies are explored in depth in the next section.)

Begin by understanding that your feelings of math anxiety are not uncommon, and that they definitely do not indicate that there is anything wrong with you or inferior about your ability to learn math. For some this can be hard to accept, but it is worth trying to accept – since after all it happens to be true. This can be made easier by exploring your own “math-history.” Think back across your career as a math student, and identify those experiences which have contributed most to your feelings of frustration about math. For some this will be a memory of a humiliating experience in school, such as being made to stand at the blackboard and embarrassed in front of one’s peers. For others it may involve interaction with a parent. Whatever the principle episodes are, recall them as vividly as you are able to. Then, write them down. This is important. After you have written the episode on a sheet(s) of paper, write down your reaction to the episode, both at the time and how it makes you feel to recall it now. (Do this for each episode if there is more than one.)

After you have completed this exercise, take a fresh sheet of paper and try to sum up in a few words what your feelings about math are at this point in your life, together with the reason or reasons you wish to succeed at math. This too is important. Not until after we lay out for ourselves in a conscious and deliberate way what our feelings and desires are towards mathematics, will it become possible to take possession of our feelings of math anxiety and become free to implement strategies for coping with those feelings.

At this point it can be enormously helpful to share your memories, feelings, and goals with others. In a math class I teach for arts majors, I hand out a questionnaire early in the semester asking students to do exactly what is described above. After they have spent about twenty minutes writing down their recollections and goals, I lead them in a classroom discussion on math anxiety. This process of dialogue and sharing – though it may seem just a bit on the goopy side – invariably brings out of each student his or her own barriers to math, often helping these students become completely conscious of these barriers for the first time. Just as important, it helps all my students understand that the negative experiences they have had, and their reactions to them, are shared one way or another by almost everyone else in the room.

If you do not have the opportunity to engage in a group discussion in a classroom setting, find friends or relatives whom

you trust to respect your feelings, and induce them to talk about their own experiences of math anxiety and to listen to yours.

Once you have taken possession of your math anxiety in this way, you will be ready to implement the strategies outlined below.



Mathematics, as a field of study, has features that set it apart from almost any other scholastic discipline. On the one hand, correctly manipulating the notation to calculate solutions is a skill, and as with any skill mastery is achieved through practice. On the other hand, such skills are really only the surface of mathematics, for they are only marginally useful without an understanding of the concepts which underlie them.

The value of a problem is not so much coming up with the answer as in the ideas and attempted ideas it forces on the would be solver.

– I.N. Herstein

Consequently, the contemplation and comprehension of mathematical ideas must be our ultimate goal. Ideally, these two aspects of studying mathematics should be woven together at every point, complementing and enhancing one another, and in this respect studying mathematics is much more like studying, say, music or painting than it is like studying history or biology.

In view of mathematics’ unique character, the successful student must devise a special set of strategies for accomplishing his or her goals, including strategies for lecture taking, homework, and exams. We will examine each of these in turn. Keep in mind that these strategies are suggestions, not laws handed down from the mountain. Each student must find for him or herself the best way to implement these ideas, fitting them to his or her own unique learning styles. As the Greek said, know thyself!

Taking Lectures

Math teachers are a mixed bag, no question, and it’s easy to criticize, especially when the criticism is justified. If your own math teacher really connects with you, really helps you understand, terrific – and be sure to let him or her know. But if not, there are a couple of things you will want to keep in mind.

To begin with, think what the teacher’s job entails. First, a textbook must be chosen, a syllabus prepared, and the material being taught (which your teacher may or may not have worked with in some time) completely mastered. This is before you ever step into class on that first day. Second, for every lecture the teacher gives, there is at least an hour’s preparation, writ-

ing down lecture notes, thinking about how best to present the material, and so on. This is on top of the time spent grading student work – which itself can be done only after the instructor works the exercises for him or herself. Finally, think about the anxiety you feel about speaking to an audience, and about your own math anxiety, and then imagine what a math teacher must do: manage both kinds of anxiety simultaneously. It would be wonderful if every instructor were a brilliant lecturer. But even the least brilliant deserves consideration for the difficulty of the job.

The second thing to keep in mind is that getting the most out of a lecture is your job. Many students suppose that writing furiously to get down everything the instructor puts on the

that about a third of the students in any given class, on any

