How to Reduce Math Test Anxiety

WHAT YOU WILL LEARN IN CHAPTER 3

- Understanding Math Anxiety
- How To Recognize Test Anxiety
- Causes of Test Anxiety
- Different Types of Test Anxiety
- How To Reduce Test Anxiety

In this chapter you will first learn about math anxiety and then explore test anxiety. They are different issues that can affect each other. It is best to learn about them as separate entities first.

Math anxiety is a common problem for many high school, college, and university students. It is especially difficult for students in developmental courses, who normally have more math anxiety than other students. However, there are students in higher-level math courses who also struggle with this problem. It is very common for students to have anxiety only about math and not in their other subjects.

Most students think that math anxiety affects them only when they are taking tests, but it also affects other areas. It can affect the way you do your homework, the way you learn in the classroom or through distance learning courses, and the way you choose a career. Students who have math anxiety may procrastinate in doing their homework or put off sitting down and completing an online lesson. This can lead to math failure. Students also select majors based on the amount of math that is required, which could lead to lower-paying or dissatisfying careers. However, most students with math anxiety meet it face to face during tests, experiencing test anxiety as well.

Mild test anxiety can be a motivational factor in that it can make students properly prepare for a test. However, high test anxiety can cause...
major problems in both learning and test taking, as students avoid studying for the test when anxiety begins to affect their thought processes. Reducing test anxiety is the key for many students to become successful in math. Such students need to learn the causes of test anxiety and how to reduce the test anxiety that affects their learning and grades.

Several techniques have proven helpful in reducing both math anxiety and math test anxiety. However, reducing them does not guarantee good math grades. It must be coupled with effective study skills and a desire to do well in math.

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**Understanding Math Anxiety**

**Definitions of Math Anxiety**

Math anxiety is a relatively new concept in education. During the 1970s, certain educators began referring to *mathophobia* or *mathemaphobia* as a possible cause for children’s unwillingness to learn math. Math anxiety is an extreme emotional and/or physical reaction to a very negative attitude toward math. There is a strong relationship between low math confidence and high math test anxiety (Fox, 1977).

Math anxiety is the feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of math problems during tests (Richardson and Suinn, 1973). Math anxiety is a state of panic, helplessness, paralysis, and mental disorganization that occurs in some students when they are required to solve math problems. This discomfort varies in intensity and is the outcome of numerous experiences students have had in their past learning situations (Tobias, 1978).

Today, math anxiety is accepted as one of the major problems students have in completing their math courses. It is real, but it can be overcome.

**Types of Math Anxiety**

Math anxiety can be divided into three separate anxieties: math test anxiety, numerical anxiety, and abstraction anxiety. Math test anxiety involves anticipation, completion, and feedback of math tests. Numerical anxiety refers to everyday situations requiring people to work with numbers and perform arithmetic calculations. Numerical anxiety can also include students who are trying to figure out the amount of a tip, thinking about mathematics, doing math homework, or listening to or seeing math instruction. Abstraction anxiety involves working with variables and mathematical concepts used to solve equations. Students can have all three math anxieties or only one anxiety. Most often, the students I have worked with have had math test anxiety and abstraction anxiety. These students don’t have any anxiety working with numbers, but once they start learning algebra, they develop both conditions. This may have happened in high school or college.

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_**Remember**_ When people try to overcome anxiety of any kind, including math anxiety, they must seek advice and support. It is much easier with support!

**The Causes of Math Anxiety**

Since math anxiety is a learned condition, its causes are unique to each student, but they are all rooted in individuals’ past experiences. Bad experiences in elementary school are one of the most common sources of students’ math anxiety: coming in last in math races at the blackboard, watching classmates finish problems twice as fast as they do, teachers saying, “That’s okay, you just aren’t good in math, you are better in English,” and classmates and teachers calling them stupid. These words and experiences remain with people; they can still hear the words and eventually begin telling themselves the same thing. When these students walk into a classroom or open a math book, or take a test, these “mental tapes” play in their minds. When asked, many students indicate that they were made fun of when trying to solve math problems at the chalkboard. When they could not
solve the problems, the teacher and/or students would call them "stupid."

Teacher and peer embarrassment and humiliation become the conditioning experiences that cause some students’ math anxiety. Over the years, this math anxiety is reinforced and even increases in magnitude. In fact, many math-anxious students—now 30, 40, and 50 years old—still have extreme fear about working math problems on the board. One 56-year-old indicated that he had a great deal of fear that the instructor would call him to the board. Even if he knew how to do the problem, displaying that knowledge to his peers was very difficult. Some students have said that they absolutely refused to go to the board.

Being embarrassed by family members can also cause math anxiety. According to students who have been interviewed on the matter, their parents tried to help them with math and this sometimes led to serious trauma. These students claim that the tutoring from their guardians, mainly their fathers, often resulted in scolding when they were not able to complete the problems. One student reported that his father hit him every time he got a multiplication problem wrong. Brothers and sisters can also tease one another about being “dumb” in math. This is particularly true of boys telling girls that they cannot do math. When people hear these statements often enough, they may start to believe them and associate these bad feelings with the word math. So, for students many years later, just hearing the word “math” triggers a response of anxiety, consciously or unconsciously recalling the bad feelings, and becoming uneasy.

A good example of this is a student I worked with who had completed her B.S. degree 15 years ago at a college that did not require much math. She was returning to college to be an elementary school teacher, which required her to take math and a math placement test. As soon as I mentioned that she had to take math, she said, “I can’t do math and I will have to wait a few days to get psychologically ready to take the math placement test.” She indicated that her old feeling of not being able to do math rushed through her and she almost had an anxiety attack. This is an extreme case, but a true example, of math anxiety. In most cases, math anxiety is not this bad, but it is disruptive enough to cause learning and testing problems.

In order to overcome math anxiety, it is necessary to identify when it first started and what caused it. Math anxiety usually starts from one or a series of events in a student’s past that were negative. Negative feelings were imbedded in memories and then anxiety started whenever the student was placed in similar situations.

Answer the questions on the Exploring Past Math Experiences Worksheet.

If some of the memories are tough ones, just make a short note of them right now. Don’t dwell on them, because they are in the past. This can be frustrating for some students, but it is worth working through it. You will realize that math anxiety is usually a result of events, and does not occur because you are “dumb” or have other personal flaws.

If you have had a very positive experience in the past when you were studying math, brainstorm answers to the appropriate questions. You may want to keep in mind friends you know who struggle with math and think about the other questions.

This brainstorming will help you write your math autobiography assignment at the end of this chapter.

Some Facts to Remember

- Math anxiety is usually a result of past experiences that were negative. As a result of these experiences, any time a person is put in a similar situation, he/she gets anxious.
- Math anxiety is not related to how smart a person is.
- Math anxiety is a learned condition; therefore, in most cases, it can be unlearned or at least managed.
- A person must be willing to change and find strategies to practice continually that will help manage math anxiety.
Exploring Past Math Experiences Worksheet

At the end of this chapter you will write a "Math Autobiography" to help you explore why you might have math anxiety. This knowledge is the first step in learning how to manage or overcome the anxiety. This worksheet will help you prepare for writing the autobiography. Answer the following questions. For some students, these questions will be easy to answer; for others, they will be more difficult because their past experiences are quite negative. The more honest you can be, the more you will be able to confront and work on any math anxiety.

1. When was the first time you were nervous or anxious about learning math? (Do not include taking tests.) Was it in elementary, middle, or high school? Can you recall a specific incident? If so, briefly describe it. It could have taken place in school or at home.

   Examples: Getting scolded by a teacher or parent for a poor homework grade. Losing a math race on the board. Going to recess late because you did not get your math work done in time. Older sibling always comparing math grades with you.

2. When was the last time you told yourself that you couldn’t do math or were just not a math type?

3. Even though you might have math anxiety, there were probably some positive experiences associated with math in the past. Try to think of at least one of them.

   Examples: A good grade. Completing an assignment in class. A parent or teacher praising you for your math work.

4. If you have math anxiety, take heart. Most students can learn to minimize it and control it. Write a statement declaring that you will set a goal to learn to manage your math anxiety this semester.

How Math Anxiety Affects Learning

Math anxiety can cause learning problems in several ways. It can affect how you do your homework and your participation in the classroom and in study groups. Let’s first start by looking at how math anxiety could affect your homework. Students with high math anxiety may have difficulty starting or completing their homework.

Doing homework reminds some students of their learning problems in math. More specifically, it reminds them of their previous math failures, which causes further anxiety. This anxiety can lead to total avoidance of homework or “approach-avoidance” behavior.

Total homework avoidance is called procrastination. The very thought of doing their homework
causes these students anxiety, which causes them to put off tackling their homework. This makes them feel better for a short amount of time—until test day.

Math anxiety can also affect your classroom participation and learning. Usually students with math anxiety are afraid to speak out in class and ask questions. They remember that in the past they were made fun of when they gave incorrect answers. They are also afraid of asking a question that others, including the teacher, will consider “dumb.” So they sit in class fearful of being asked a question, looking like they understand the lecture so they will not be called on. They also take a lot of notes even though they don’t understand them, in order to give the illusion of comprehension. If you are one of these students, these are hard habits to break. However, these habits may cause you to be unsuccessful in your math class. Here are some suggestions that may help you break these habits:

1. Make an appointment to talk to your math instructor. Math instructors want you to talk to them. When I do my consulting around the country, one of the major complaints I get from math instructors is that the students don’t come and see them. Make an appointment to see your math instructor before the first major test to discuss your math history and to ask for learning suggestions. In most cases it is easier to talk to the instructor before you get your first grade.

2. Before class, ask the instructor to work one homework problem. You might want to write the problem on the board before the instructor arrives. This is less stressful because you are not asking the question in front of the whole class. In fact, one of my good friends, Dr. Mike Ham, suggests that his students put the problems they do not know how to solve on the board before class. Other students go to the board and solve the problems. Dr. Ham then solves the ones the students cannot solve.

3. Prepare one question from your homework and ask it within the first 15 minutes of class. Instructors are more likely to answer questions in the first part of class when they have time instead of the end of class when time is running out.

4. Ask a question to which you already know the answer. The question will begin discussion with the instructor and other students when you can contribute since you understand the problem. It will set you up for a positive experience.

5. Use email to send questions to your instructor. This way, you can still get the answer with very little anxiety.

By using these suggestions, you can reduce your math anxiety and learn more mathematics. A question unanswered could be a missed test question.

Remember: The instructor’s job is to answer your questions, and you are paying for the course.

Math-anxious students sometimes avoid doing additional math outside of the classroom. They avoid study groups and supplemental instruction. It is like asking a person with hydrophobia (fear of water) to take a vacation at the beach. However, a person with hydrophobia can go to the beach and enjoy himself or herself and not get wet. In other words, students can still attend study groups and supplemental instruction and just listen. When they are ready to get their feet wet, they can ask a few questions. Don’t let these great opportunities go by.

Math anxiety can affect how you learn mathematics. It can be overcome with your effort. You don’t have to live in the past with your math fears. Today is a new day, and you can change how math affects you. The next step is to understand how test anxiety can affect your demonstration of math knowledge.
Section Review

1. List and explain the three types of math anxiety.
   - First Type: ____________________________
   - Second Type: ____________________________
   - Third Type: ____________________________

2. List and explain two causes of math anxiety.
   - First Cause: ____________________________
   - Second Cause: ____________________________

3. List three ways math anxiety can cause learning problems.
   - First Way: ____________________________
   - Second Way: ____________________________
   - Third Way: ____________________________

4. List and explain three ways students can manage or avoid the effects of math anxiety.
   - First Way: ____________________________
   - Second Way: ____________________________
   - Third Way: ____________________________

How to Recognize Test Anxiety

Test anxiety has existed for as long as tests have been used to evaluate student performance. Because it is so common and because it has survived the test of time, test anxiety has been carefully studied over the last 50 years. Pioneering studies indicate that test anxiety generally leads to low test scores. At the University of South Florida (Tampa), Dr. Charles Spielberger investigated the relationship between test anxiety and intellectual ability. The study results suggested that anxiety coupled with high ability can improve academic performance; but anxiety coupled with low or average ability can interfere with academic performance. That is:

Anxiety + high ability = improvement
Anxiety + low or average ability = no improvement

Example: Students with average ability and low test anxiety had better performance and higher grades than did students with average ability and high test anxiety. However, there are students who make good grades, take calculus, and still have test anxiety.

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Test anxiety is a learned response; a person is not born with it. An environmental situation brings about test anxiety. The good news is that because it is a learned response, it can be unlearned. Test anxiety is a special kind of general stress. General stress is considered to be “strained exertion,” which can lead to physical and psychological problems.

Math Test Anxiety

There are several definitions of test anxiety. One definition states, “Test anxiety is a conditioned emotional habit to either a single terrifying experience, recurring experience of high anxiety, or a continuous condition of anxiety” (Wolpe, 1958).

Another definition of test anxiety relates to the educational system. The educational system develops evaluations that measure one’s mental performance, and this creates test anxiety. This definition suggests that test anxiety is the anticipation of some realistic or nonrealistic situational threat (Cattell, 1966). The “test” can be a research paper, an oral report, work at the blackboard, a multiple-choice exam, a written essay, or a math test.

Math test anxiety is a relatively new concept in education. Ms. magazine published “Math Anxiety: Why Is a Smart Girl Like You Counting on Your Fingers?” (Tobias, 1976) and coined the phrase math anxiety. During the 1970s, other educators began referring to mathophobia or mathemaphobia as a possible cause of children’s unwillingness to learn math. Additional studies on the graduate level discovered that math anxiety was common among adults as well as children.

One of my students once described math test anxiety as “being in a burning house with no way out.” No matter how you define it, math test anxiety is real, and it affects millions of students.

Why Math Tests Create Anxiety

It has been shown that math anxiety exists among many students who usually do not suffer from other tensions. Counselors at a major university reported that one-third of the students who enrolled in behavior therapy programs offered through counseling centers had problems with math anxiety (Suinn, 1988).

Educators know that math anxiety is common among college students and is more prevalent in women than in men. They also know that math anxiety frequently occurs in students with below average high school math backgrounds. These students were found to have the greatest amount of anxiety.

Approximately half of the students in college prep math courses (designed for students with inadequate high school math backgrounds or low placement scores) could be considered to have math anxiety. However, math anxiety also occurs in students in high-level math courses, such as college algebra and calculus.

Educators investigating the relationship between anxiety and math have indicated that anxiety contributes to poor grades in math. They have also found that simply reducing math test anxiety does not guarantee higher math grades. Students often have other problems that affect their math grades, such as poor study skills, poor test-taking skills, or poor class attendance.

Section Review

1. What is your personal definition of test anxiety?

2. What type of student does math anxiety affect most?
The Causes of Test Anxiety

The causes of test anxiety can be different for each student, but they can be explained by seven basic concepts. See Figure 3.

The causes of math test anxiety can be different for each student. It could possibly have first occurred in middle school or high school. However, for many students it first occurs in college when passing tests is the only way to pass the course. Homework and extra credit in most college courses don’t count toward your grade. Now students must have a passing average and in some cases must pass the departmental final exam. Additional pressure also exists because not passing algebra means you won’t graduate and you might not get the job you want. As you can see, there are more reasons to have math test anxiety in college than in high school.

If you have math test anxiety, I want you to try to remember the first time it surfaced. Was it in middle school, high school, or college? Can you recall a specific incident? Was it your first algebra test? Was it your first math test after being out of school for a long time? Was it after you decided to get serious about college? Was it a college algebra course that was required for your major? Was it an instructor who told you that if you didn’t pass the next math test you would fail the course? Was it when you needed to pass the next math test to pass the course so you could keep your financial aid? Was it your children asking you why you failed your last math test? If you cannot remember a specific incident when you had test anxiety, do you expect to have any major anxiety on the next test you take?

Students with math test anxiety also have had positive experiences with taking math tests. Now try to remember your first positive experience with taking a math test. Was it in middle school, high school, or college? Was it after studying many hours for the test? Now think back to your last positive experience with a math test. How did it make you feel?

Since we have already explored your experiences with taking math tests, let’s look at some of the direct causes of your math test anxiety. If you do have test anxiety, what is the main cause? If you don’t know, then review the seven causes of test anxiety in Figure 3. Does one of these reasons fit you? If you don’t have test anxiety, what would be a reason that could cause test anxiety?

Like you did before, brainstorm answers to the questions listed in the previous three paragraphs. You will also use this brainstorming to help you write your autobiography.

Remember:

For some students, just writing about their previous math history helps them.

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Figure 3 Causes of Test Anxiety

- Test anxiety can be a learned behavior resulting from the expectations of parents, teachers, or other significant people in the student’s life.
- Test anxiety can be caused by the association between grades and a student’s personal worth.
- Test anxiety develops from fear of alienating parents, family, or friends due to poor grades.
- Test anxiety can stem from a feeling of lack of control and an inability to change one’s life situation.
- Test anxiety can be caused by a student’s being embarrassed by the teacher or other students when trying to do math problems.
- Test anxiety can be caused by timed tests and the fear of not finishing the test, even if one can solve all the problems.
- Test anxiety can be caused by being put in math courses above one’s level of competence.

What is (are) the cause(s) of your test anxiety?
Section Review

1. List and describe five causes of test anxiety.
   First Cause: 
   Second Cause: 
   Third Cause: 
   Fourth Cause: 
   Fifth Cause: 

2. Put into your own words your cause(s) of test anxiety. If you don't have test anxiety, list what you think is the major cause of test anxiety.

The Different Types of Test Anxiety

The two basic types of test anxiety are emotional anxiety (educators call this somatic anxiety) and worry anxiety (educators call this cognitive anxiety). Students with high test anxiety have both emotional and worry anxiety.

Signs of emotional anxiety are upset stomach; nausea; sweaty palms; pain in the neck; stiff shoulders; high blood pressure; rapid, shallow breathing; rapid heartbeat; and general feelings of nervousness. As anxiety increases, these feelings intensify. Some students even run to the bathroom to throw up or have diarrhea.

Even though these feelings are caused by anxiety, the physical response is real. These feelings and physical inconveniences can affect your concentration and your testing speed, and they can cause you to “draw a blank.”

Worry anxiety causes the student to think about failing the test. These negative thoughts can happen either before or during the test. This negative “self-talk” causes students to focus on their anxiety instead of recalling math concepts.
The effects of test anxiety range from a "mental block" on a test to avoiding homework. One of the most common side effects of test anxiety is getting the test and immediately forgetting information that you know. Some students describe this event as having a "mental block," "going blank," or finding that the test looks like a foreign language.

After five or ten minutes into the test, some of these students can refocus on the test and start working the problems. They have, however, lost valuable time. For other students, anxiety persists throughout the test and they cannot recall the needed math information. It is only after they walk out the door that they can remember how to work the problems.

Sometimes math anxiety does not cause students to "go blank" but slows down their mental processing speed. This means it takes longer to recall formulas and concepts and to work problems. The result is frustration and loss of time, leading to more anxiety. Since, in most cases, math tests are speed tests (those in which you have a certain amount of time to complete the test), you may not have enough time to work all the problems or to check the answers if you have mentally slowed down. The result is a lower test score, because even though you know the material, you do not complete all of the questions before test time runs out.

Not using all of the time allotted for the test is another problem caused by test anxiety. Students know that they should use all of the test time to check their answers. In fact, math is one of the few subjects in which you can check test problems to find out if your work is correct. However, most students do not use all of the test time, and this results in lower test scores. Why does this happen?

Students with high test anxiety do not want to stay in the classroom. This is especially true of students whose test anxiety increases as the test progresses. The test anxiety gets so bad that they would rather leave early and receive a lower grade than stay in that "burning house."

Students have another reason for leaving the test early: the fear of what the instructor and other students will think about them for being the last one to hand in the test. These students refuse to be the last ones to finish the test because they think that the instructor or other students will think they are "dumb." This is middle school thinking, but the feelings are still real — no matter what the age of the student. These students do not realize that some students who turn in their tests first fail, whereas many students who turn in their tests last make As and Bs.

Another effect of test anxiety relates to completing homework assignments. Students who have high test anxiety may have difficulty starting or completing their math homework. Doing homework reminds some students of their learning problems in math. More specifically, it reminds them of their previous math failures, which causes further anxiety. This anxiety can lead to total homework avoidance or "approach-avoidance" behavior.

Total homework avoidance is called procrastination. The very thought of doing their homework causes these students anxiety, which causes them to put off tackling their homework. This makes them feel better for a short amount of time—until test day.

**Example:** Some students begin their homework and work some problems successfully. They then get stuck on a problem that causes them anxiety, so they take a break. During their break the anxiety disappears until they start doing their homework again. Continuing their homework causes more anxiety, which leads to another break. The breaks become more frequent. Finally, the student ends up taking one long break and not doing the homework. Quitting, to them, means no more anxiety until the next homework assignment.

The effects of math test anxiety can be different for each student. Students can have several of the mentioned characteristics that can interfere with math learning and test taking. However, there are certain myths about math that each student needs to know. Review Figure 4, The 12 Myths About Test Anxiety, to see which ones you believe. If you have test anxiety, which of the items listed is (are) true for you?
Figure 4 The 12 Myths About Test Anxiety

1. Students are born with test anxiety.
2. Test anxiety is a mental illness.
3. Test anxiety cannot be reduced.
4. Any level of test anxiety is bad.
5. All students who are not prepared have test anxiety.
6. Students with test anxiety cannot learn math.
7. Students who are well prepared will not have test anxiety.
8. Very intelligent students and students taking high-level courses, such as calculus, do not have test anxiety.
9. Attending class and doing homework should reduce all test anxiety.
10. Being told to relax during a test will make a student relaxed.
11. Doing nothing about test anxiety will make it go away.
12. Reducing test anxiety will guarantee better grades.

Section Review

1. List and describe the two basic types of test anxiety.
   
   First Type: ____________________________
   Second Type: ____________________________

2. List two reasons students leave the test room early instead of checking their answers.
   
   First Reason: ____________________________
   Second Reason: ____________________________

3. List six of the twelve myths about test anxiety that you most believed.
   
   First Myth: ____________________________
   Second Myth: ____________________________
   Third Myth: ____________________________
   Fourth Myth: ____________________________
   Fifth Myth: ____________________________
   Sixth Myth: ____________________________
How to Reduce Test Anxiety

To reduce math test anxiety, you need to understand both the relaxation response and how negative self-talk undermines your abilities.

Relaxation Techniques

The relaxation response is any technique or procedure that helps you to become relaxed. It will take the place of an anxiety response. Someone simply telling you to relax or even telling yourself to relax, however, does little to reduce your test anxiety. There are both short-term and long-term relaxation response techniques that help control emotional (somatic) math test anxiety. These techniques will also help reduce worry (cognitive) anxiety. Effective short-term techniques include the tensing and differential relaxation method, the palming method, and deep breathing.

Short-Term Relaxation Techniques

The Tensing and Differential Relaxation Method The tensing and differential relaxation method helps you relax by tensing and relaxing your muscles all at once. Follow these procedures while you are sitting at your desk before taking a test:

1. Put your feet flat on the floor.
2. With your hands, grab underneath the chair.
3. Push down with your feet and pull up on your chair at the same time for about five seconds.
4. Relax for five to ten seconds.
5. Repeat the procedure two or three times.
6. Relax all your muscles except the ones that are actually used to take the test.

The Palming Method The palming method is a visualization procedure used to reduce test anxiety. While you are at your desk before or during a test, follow these procedures:

1. Close and cover your eyes using the center of the palms of your hands.
2. Prevent your hands from touching your eyes by resting the lower parts of your palms on your cheekbones and placing your fingers on your forehead. Your eyeballs must not be touched, rubbed, or handled in any way.
3. Think of some real or imaginary relaxing scene. Mentally visualize this scene. Picture the scene as if you were actually there, looking through your own eyes.
4. Visualize this relaxing scene for one to two minutes.
5. Open your eyes and wait about two minutes and visualize the scene again. This time also imagine any sounds or smells that can enhance your scene. For example, if you are imagining a beach scene, imagine the sound of the waves on the beach and the smell of the salty air. This technique can also be completed without having your hands over your eyes by just closing your eyes.

Practice visualizing this scene for several days before taking a test and the effectiveness of this relaxation procedure will improve.

Deep Breathing Deep breathing is another short-term relaxation technique that can help you relax. Proper breathing is a way to reduce stress and decrease test anxiety. When you are breathing properly, enough oxygen gets into your bloodstream to nourish your body and mind. A lack of oxygen in your blood contributes to an anxiety state that makes it more difficult to react to stress. Proper deep breathing can help you control your test anxiety.

Deep breathing can replace the rapid, shallow breathing that sometimes accompanies test anxiety, or it can prevent test anxiety. Here are the steps in the deep breathing technique:

1. Sit straight up in your chair in a good posture position.
2. Slowly inhale through your nose.
3. As you inhale, first fill the lower section of your lungs and work your way up to the upper part of your lungs.
4. Hold your breath for a few seconds.
5. Exhale slowly through your mouth.
6. Wait a few seconds and repeat the cycle.
7. Keep doing this exercise for four or five minutes. This should involve going through about ten breathing cycles. Remember to take two normal breaths between cycles. If you start to feel lightheaded during this exercise, stop for 30 to 45 seconds and then start again.
8. Throughout the entire exercise, make sure you keep breathing smoothly and in a regular rhythm without gulping air or suddenly exhaling.
9. As an extra way to improve your relaxation, say “relax” or “be calm” to yourself as you exhale. This can start a conditioned response that can trigger relaxation when you repeat the words during anxious situations. As you keep practicing, this conditioned response will strengthen. Practice is the key to success.

You need to practice this breathing exercise for several weeks before using the technique during tests. If you don’t practice this technique, it will not work. After taking your first test, keep doing the exercise several times a week to strengthen the relaxation response.

The CD How to Reduce Test Anxiety further explains test anxiety and discusses these and other short-term relaxation response techniques. Short-term relaxation techniques can be learned quickly but are not as successful as the long-term relaxation technique. Short-term techniques are intended to be used while learning the long-term technique.

**Long-Term Relaxation Technique**

The cue-controlled relaxation response technique is the best long-term relaxation technique. It is presented on the CD How To Reduce Test Anxiety. Cue-controlled relaxation means you can induce your own relaxation based on repeating certain cue words to yourself. In essence, you are taught to relax and then silently repeat cue words, such as “I am relaxed.” After enough practice, you can relax during math tests. The cue-controlled relaxation technique has worked with thousands of students. For a better understanding of test anxiety and how to reduce it, listen to How to Reduce Test Anxiety.

**Negative Self-Talk**

According to cognitive psychologists, self-talk is what we say to ourselves as a response to an event or situation. This self-talk determines our feelings about that event or situation. Sometimes we say it so quickly and automatically that we don’t even hear ourselves. We then think it is the situation that causes the feeling, but in reality it is our interactions or thoughts about the experience that are controlling our emotions. This sequence of events can be represented by the following timeline:

\[
\text{External Events (Math test)} \quad \downarrow
\]

\[
\text{Interpretation of Events and Self-Talk (How you feel about the test and what you are telling yourself)} \quad \downarrow
\]

\[
\text{Feelings and Emotions (Happy, glad, angry, mad, upset)}
\]

In most cases this means that you are responsible for how and what you feel. You can engage in positive self-talk or negative self-talk about taking a math test. Yes, some students practice positive self-talk about math tests and see each test as a challenge and something to accomplish that makes them feel good, while others see it as an upsetting event that leads to anger and anxiety. In other words, you are what you tell yourself.

Negative self-talk is a form of worry (cognitive anxiety). This type of worrying can interfere with your test preparation and can keep you from concentrating on the test. Worrying can motivate you to study, but too much worrying may prevent you from studying at all.
Negative self-talk is defined as the negative statements you tell yourself before and during tests. Negative self-talk causes students to lose confidence and to give up on tests. Furthermore, it can give you an inappropriate excuse for failing math and cause you to give up on learning math.

**Examples of Negative Self-Talk**

"It doesn't matter how hard I work. I am going to fail the class no matter what."

"I have already failed this class before. There is no way I can pass it this time, either."

"I do not get these problems. I am going to fail this test and flunk the course."

"I knew how to do these problems not 15 minutes ago, and now... nothing! What is up with me, I always do this when I take math tests."

"If I can't even pass this easy test, how can I expect to pass the math classes I need to graduate?"

Students who have test anxiety are prone to negative self-talk. Test anxiety can be generated or heightened by repeatedly making statements to yourself that usually begin with “What if.” For example, “What if I fail the test?” or “What if I fail this class again?” These “what if” statements generate more anxiety that can cause students to feel sick. These statements tell them to be anxious. Some other aspects of self-talk are:

- Self-talk can be in telegraphic form with short words or images.
- Self-talk can be illogical, but at the time, the person believes it.
- Negative self-talk can lead to avoidance such as not taking a test or skipping classes.
- Negative self-talk can cause more anxiety.
- Negative self-talk can lead to depression and a feeling of helplessness.
- Negative self-talk is a bad habit that can be changed.

There are different types of negative self-talk. If you have negative self-talk, then review the types below and see which one fits you best. You may use a combination of them.

1. **The Critic** is the person inside us who is always trying to put us down. It constantly judges our behaviors and finds fault even if there is none. It jumps on any mistake and exaggerates it to cause more anxiety. The Critic puts us down for mistakes on tests and blames us for not controlling our anxiety. The Critic reminds us of previous comments from real people who have criticized us. It compares us with other students who are doing better in the class. It loves to say, “That was a stupid mistake!” or “You are a total disappointment. You can’t pass this math class like everyone else can!” The Critic’s goal is to promote low self-esteem.

2. **The Worrier** is the person inside us who looks at the worst-case scenario. It wants to scare us with ideas of disaster and complete failure. When it sees the first sign of anxiety, it “blows it out of proportion” to the extent that we will not remember anything and totally fail the test. The Worrier creates more anxiety than normal. The Worrier anticipates the worst, underestimates our ability, and sees us not only failing the test but also “failing life.” The Worrier loves to ask “What if?” For example, “What if I fail the math test and don’t graduate?” or “What if I can’t control my anxiety and throw up in math class?” The goal of the Worrier is to cause more anxiety so we will quit.

3. **The Victim** is the person inside us who wants us to feel helpless or hopeless. It wants us to believe that no matter what we do, we will not be successful in math. The Victim does not blame other events (poor schooling) or people (bad teachers) for our math failures. It blames us. It dooms us and puts us into a learned helpless mode, meaning that if we try to learn math, we will fail, or if we don’t try to learn math, we will fail. So why try? The Victim likes to say, “I can’t
learn math." The goal of the Victim is to cause depression and make us stop trying.

4. **The Perfectionist** is similar to the Critic, but is the opposite of the Victim. It wants us to do the best we can and will guide us into doing better. It tells us that we are not studying enough for math tests and that a B is not good enough and that we must make an A. In fact, sometimes an A is not good enough unless it is a score of 100 percent. So, if we make a B on a test, the Perfectionist says, "An A or a B is just like making an F." The Perfectionist is the hard-driving part of us that wants the best but cannot stand mistakes or poor grades. It can drive us to mental and physical exhaustion to make that perfect grade. It is not interested in self-worth, just perfect grades. Students driven by the Perfectionist often drop a math course because they only have a B average.

The Perfectionist loves to repeat, "I should have ..." or "I must ..." The goal of the Perfectionist is to cause chronic anxiety that leads to burnout.

Review these types of personalities to see which one may fit you best. We may have a little of each one in us, but what is the dominant one for you in math? Now we can look at how to stop these negative thoughts.

**Managing Negative Self-Talk**

Students need to change their negative self-talk to positive self-talk without making unrealistic statements.

Positive self-statements can improve your studying and test preparation. During tests, positive self-talk can build confidence and decrease your test anxiety. These positive statements (see examples) can help reduce your test anxiety and improve your grades. Some more examples of positive self-statements are on the CD *How to Reduce Test Anxiety*. Before each test, make up some positive statements to tell yourself.

There are several ways to counter and control negative self-talk. Students can replace negative self-talk with positive statements and questions that make them think in a realistic way about the situation. Another way is to develop thought-stopping techniques to reduce or eliminate the negative thoughts. Try each way or a combination to see what works best for you.

Countering self-talk involves writing down and practicing positive statements that can replace negative statements. Students can develop their own positive statements. Some rules for writing positive statements are:

1. Use the first person present tense. For example, "I can control my anxiety and relax myself."

2. Don’t use negatives in the statement. For example, don’t say, "I am not going to have anxiety." Instead, say, "I will be calm during the test."

3. Have a positive and realistic belief in the statement. For example, say, "I am going to pass this test," instead of saying, "I am going to make an A on this test" when you have not made an A on any of the tests.

The statements used to counter negative thoughts can be based on the type of negative self-talk we tend to engage in. The Critic who puts us down by saying, "Your test anxiety is going to cause you to fail the test" can be countered with, "I have test anxiety, but I am learning to control it." The Worrier who asks, "What if I fail the test?" can be countered with "So what? I will do better on the next test." The Victim who thinks things are hopeless and says, "I will never be able to pass math" can be countered with, "I have studied differently for this test, and I can pass the math course." The Perfectionist who says, "I need to make an A on the test or I will drop out of school" can be countered with, "I don’t need to make an A to please anyone. All I need is to pass the math course to get the career I want." These are some of the examples of positive statements that can control anxiety.

**Examples of Positive Self-Talk**

"I might have failed the course last semester, but things are going to be different this time now that I have learned how to study math."
“Now that I know how to fight off test anxiety, there is no way I will panic during an exam like I did before.”

“Just because I haven’t had perfect results in the past doesn’t mean that I am bad at math. This time, I know how to study math, so this course should not be a problem.”

“If I put in the work, then I will pass with flying colors.”

“I have done everything I needed to do to prepare for this test. If I can keep my composure during the test, and not get frustrated if I don’t understand one or two problems, I should do all right.”

“I will not let this one problem bother me. I have answered all the other problems correctly, so I cannot let this one make me miss the rest of the questions on the test.”

“I will not hurry in order to be the first person to finish this test. I can go ahead and take my time to make sure I don’t make any careless mistakes.”

Thought-Stopping Technique
Some students have difficulty stopping their negative self-talk. These students cannot just tell themselves to eliminate those thoughts. These students need to use a thought-stopping technique to overcome their worry and become relaxed.

Thought stopping involves focusing on the unwanted thoughts and, after a few seconds, suddenly stopping those thoughts by emptying your mind. Using the command “Stop!” or a loud noise like clapping your hands can effectively interrupt the negative self-talk. In a homework situation, you may be able to use a loud noise to stop your thoughts, but don’t use it during a test.

To stop your thoughts in the classroom or during a test, silently shout to yourself “Stop!” or “Stop thinking about that!” After your silent shout, either relax yourself or repeat one of your positive self-talk statements. You may have to shout to yourself several times during a test or while doing homework to control negative self-talk. After every shout, use a different relaxation technique/scene or positive self-talk statement.

Thought stopping works because it interrupts the worry response before it can cause high negative emotions. During that interruption, you can replace the negative self-talk with positive statements or relaxation. However, students with high worry anxiety should practice this technique for three days to one week before taking a test. Contact your counselor if you have additional questions about the thought-stopping technique.

Writing Your Math Autobiography
An autobiography relates how you remember and feel about your past experiences. In addition, many autobiographies explore how these past feelings and experiences shape current life. While some people write autobiographies so that others can learn about their lives, many people write private autobiographies in order to understand what is going on in their lives.

Use the Appendix as a guide to writing your math autobiography. Your final product will be a typed (or handwritten if your instructor approves) paper that summarizes your experiences learning math, how you feel about these experiences, and how they shape your current perspective on learning math.

Section Review

1. Describe your best short-term relaxation technique.
2. You can use the palming method by closing your eyes and visualizing a scene without putting your hands to your face. Describe a very relaxing scene that you could visualize. Make sure to include some sounds and visual images in your scene.

3. Practice your relaxation scene for three to five minutes for the next five days. List the times and dates you practiced your scene.
   
   Date: ___________________  Time: ___________________
   Date: ___________________  Time: ___________________
   Date: ___________________  Time: ___________________
   Date: ___________________  Time: ___________________
   Date: ___________________  Time: ___________________

4. How does negative self-talk cause you to have test anxiety?

5. Make up three positive self-talk statements that are not listed in this text.
   
   Statement 1: ____________________________
   Statement 2: ____________________________
   Statement 3: ____________________________

6. Describe the thought-stopping technique in your own words.

7. What word or words will you use as your silent shout?

8. What will you do after your silent shout?

9. How does the thought-stopping technique work?
Dan's Take

In 10th grade, I achieved the lowest test score of my life. The class: trigonometry. The grade: you could count my score on one hand.

But before you judge me, let's follow my thought process before the exam:

1. I am bad at math. I do not get it.
2. This test is the third in the semester and I have already failed the previous two.
3. If I failed the other tests, what are the chances that I'll pass the third?
4. Conclusion: there is absolutely no point in studying. I can't possibly do any worse, right?

I was wrong. Horribly wrong. I could do worse ... and I did.

At the time, I was looking for an excuse to cover up the real issue behind my poor math grades: math anxiety. I convinced myself that I was just bad at math. This fear made me "draw blanks" during my exams and I would wind up failing. By thinking these thoughts, I set myself up to fail from the very beginning.

It was not until I went to a tutor that I realized that I could get over these fears. I had to stop using the excuse "I am just bad at math." With a little help, I pulled my grade up to a C. It turned out I was not bad at math at all—I was merely afraid of it!
Chapter 3 Review

1. Reducing math test anxiety ________ guarantee good math grades.
2. Test anxiety is a __________ response; a person is not ___________ with it.
3. Math test anxiety involves ___________, ___________, and ___________ of math tests.
4. One cause of test anxiety is that a student goes to the board to work a problem but is called ___________ when he or she cannot work the problem.
5. The two basic types of test anxiety are ___________ and ___________.
6. The effects of test anxiety range from a "___________" on a test to ___________ homework.
7. The ___________ and ___________ method helps you relax by tensing and relaxing your muscles all at once.
8. The palming method is a ___________ procedure used to reduce test anxiety.
9. Negative self-talk is a form of ___________ anxiety.
10. Thought stopping works because it interrupts the ___________ response before it can cause ___________ emotions.

What is the most important information you learned from this chapter?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

How can you immediately use it?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________