

## Fr. Chris' Ideas About Studying for Math

### TIME MANAGEMENT

As you move from elementary school to college, more and more of the learning happens outside the classroom. In college, the rule of thumb is 2 hours of study for every hour of lecture. At St Francis, you may not need a 2 to 1 ratio of study time to be successful, but we do meet less frequently (with the block schedule) much like college. It is a college preparatory curriculum that requires an organized approach to your time outside class. Some math concepts are best learned with short *BUT frequent* practice. If you need to practice daily, it is up to you to schedule that time!

### BEFORE CLASS

The folks who advertise movies and TV know how to tell you about the story, without telling you the story. Because you have an idea about what to expect, you are able to anticipate and enjoy the movie more. You already know who the major characters are, so when they walk into the room, you pay attention!

Unfortunately, I can't afford a TV ad to tell you about what exciting math topic will star in our next episode.

*What can you do instead?* **Read ahead!** At the very minimum, know what topics are being discussed. It is better to read ahead, look at the example problems, and look at the assigned problems before attempting them. You will then be able to recognize the critical material as it comes up in lecture, and already know where to apply the information or technique. Don't expect to understand everything the first time you look at it... you're just trying to see who are the "major players" are so you can follow the lecture better in class.

### DURING CLASS

As soon as you sit down, get out paper, your book and calculator. Date the notes, and open your book to section that class will start on

(Look on the board or the assignment page to figure out what section to open to). Look at the homework you were working on to see if there was something you needed to ask about.

Anything that is written on the board in a Math class should also be in your notes. These are the notes that will help you get ideas on how to solve the homework. These are the notes that will remind you in a few weeks on what to remember before the test. Remember, you are writing to your future self, and even if you seldom look at what you write, the time spent writing these notes aids your ability in recalling what you are writing.

Any class time spent working out problems (whether at the board, on a worksheet or on a homework problem) is a wonderful chance to see if you really understand what you saw done during the lecture. On more than one occasion, I have asked the class to try a homework problem, and a student closes their book and says, "No I'd rather do my homework at home." Can you imagine spending money on a golf lesson with a golf pro, and when he or she asks, "Show me your swing" you reply, "No, I'd rather spend some time at the driving range" Math is an activity, much like a sport, and it is important to take advantage interactive experiences where you can ask about strategy or have someone point out a blunder or false step, or even confirm you have the right idea before "game day" when you have to figure it out on your own.

### AFTER CLASS

Before you got your driver's license, someone else drove you to all your favorite destinations. Then you got your driver's license! There you are, alone in the car and you get to drive yourself to the movies---a place you been before plenty of times...but *you* weren't the driver... now that you *are* the driver, you realize that you're not so sure about what exit to take, or whether to make a right or a left, or even which direction on the freeway to take! It's different being the driver than a passenger.

The same can be true following along solving a math problem. In high school math, you are usually more than a single step from a solution. There are many steps usually, and usually you can follow along the worked out solution during class. Since you understood every step, you are convinced that you can do it too. Often this actually is the case. But it is also possible that you may have a false impression that you can do it yourself! Simply because you can understand what is going on when you watch someone else do it, doesn't mean you can do it yourself. It is like the driving situation. It is **so** important to try to work out the math exercises yourself!

## HOMEWORK

Assignments from the book have certain problems in yellow (with a pencil next to it).

These problems have a worked out example (just like the yellow problem) in the pages immediately preceding the problem.

Worksheets from class are also designed to help you figure out how to do the assignment from the book. After writing out the question (and graph, if one is involved), follow the 4 step advice of George Polya (the famous Hungarian Mathematician who taught at Stanford) from *How to Solve It*:

1. **Understand the Problem:** Can you state the problem in your own words? What are you trying to find or do? What are the unknowns? What information do you obtain from the problem? What information, if any, is missing or not needed?
2. **Devise a Plan:** Look for a pattern. Examine related problems and determine if the same technique can be applied. Examine a simpler or special case of the problem to gain insight into the solution of the original problem. Make a table. Make a diagram. Write an equation. Use a guess and check. Work backward.
3. **Carry out the Plan:** Check each step of the plan as you proceed. Be organized so you don't have to do the same thing twice.
4. **Look Back:** Does your answer make sense? Is it reasonable? Is there a way to test to see if the solution works? Is there another method to confirm the result?

## BEFORE A QUIZ

Since these are open notes/open homework, *but NOT open book*, make sure the helpful examples from the lecture or the book are in your notes. The "Yellow" homework problems all have an example problem just like it with a step-by-step explanation. If you think there is one type of problem in the current section, you can even take notes from the book before class, and these can be used during a quiz. Since most every question is adapted from the current week's homework, obviously any homework problems you've done before or during class can be helpful. Check your answers! You don't want to rehearse the wrong way of doing things!

## BEFORE A TEST

Before a baseball game, do you see batters watching old films of Babe Ruth? Rather, don't you see them swinging at baseballs? I don't think Tiger Woods watches videos of Arnold Palmer right before a match. He swings at golf balls or putts on a few greens. While I'm sure you can learn something by watching, the time before a competition or an exam is special.

Rather than just passively read notes before a test, try to rework a problem you've solved before without looking at the solution. If you succeed, and have the time, try another like it from the odd questions in the book (so you can confirm your answer). If you have to peek at the solution or you got it wrong, try it again.

Take a look at the quiz from the previous week, especially any problems you missed. Try to rework it again without looking at the solution. If you still can't do it, look for the section of the homework assignment where it comes from. There are many example problems and odd problems there that you can try. You want to be able to confirm your results, so practice using problems you can check that are either the solution guide or the back of the book, or one of the old test keys that are at [www.mathorama.com](http://www.mathorama.com).