

How to Prepare For Class - Discussion summary

- Know what supplies you need for class.
 - There is a supply drawer in the admin office.
 - If you are teaching in a classroom with a white board, it is strongly recommended that you take your own markers and eraser.
 - Get to class early enough to take care of any issues (like a locked room) without losing class time.
 - Keep the phone number for security handy in case your classroom is locked.
- It is essential that we choose good examples to do with our classes, as students can focus on unimportant or misleading details. We talked about different ways to pick “good” examples.
 - When illustrating examples, make sure differences are exaggerated in your drawings. For example, don’t draw something as a square if it’s really a general rectangle. Some student will fixate on the fact that it’s a square and try to use that information on future problems.
 - Do difficult examples even though they take more time. For example, if you are teaching polynomial division, make sure you do examples where there are fractional coefficients in the quotient. You don’t want to any of your students with the impression that the quotient will only ever have integer coefficients.
 - Be careful with textbook definitions and carefully use examples to show how/why those definitions can be misleading.
 - Some texts define tangent lines as lines that touch the graph of the function at one and only one point; however, this is often not true. You can use a representative cubic function to show the falsity of this statement while illustrating the intended meaning of the definition.
 - Some texts state that horizontal asymptotes, like vertical asymptotes, cannot be crosses, which is also not true. Use an example that violates this to talk about the differences between horizontal and vertical asymptotes.
 - There are many topics that students commonly make mistakes with (e.g. forgetting the absolute value when taking the square root of both sides of an equation or distributing a power over a binomial instead of multiplying out). Use a specific example to show why this fails.
 - $\left(4 - \frac{9}{2}\right)^2 = \left(5 - \frac{9}{2}\right)^2$, but if you take the root of both sides, you are left with $\left(4 - \frac{9}{2}\right) = \left(5 - \frac{9}{2}\right)$ which implies that $4 = 5$. This is clearly absurd. Make sure you show why the initial equation is valid and how that leads to the necessity of the absolute value. If you do anything mathematically incorrect on the board, do not just say it is wrong and erase it. Cross it out on the board, and write “THIS IS WRONG” next to it. Students write down what is on the board and not what we say, so don’t let them leave with illegal mathematics written in their notes.

- When solving inequalities with algebraic fractions, students often want to multiply by the denominators to get rid of the fractions. This is not reasonable, so use an example like $\frac{1+x}{1-x} \geq 1$ to show what happens when you do that, contrast it with the correct solution, and again, cross out the incorrectly worked problem.
- We all have to prepare our lectures. We discussed some strategies for preparing well.
 - Have two lectures worth of prepped notes ready every time you enter the classroom. That way if you have time at the end, you can fill seamlessly.
 - There was some debate about making up problems on the spot. Consensus was that for some topics in some classes this is reasonable, but in general you want to have examples prepped beforehand. This is a way to make sure that the linear system you're working with (for example) is consistent or inconsistent depending on your desire.
 - Don't use power point slides. Ok, if you're in a classroom with a smartboard it can possibly be done well, but really, it's best to avoid them.
 - Get to know your students so that you can tailor lectures and examples to them. Do you have a bunch of humanities students? Soccer players? You can write examples that speak more to their interests that will get them more engaged in class.
- At this point, we were running a little behind, so it was a great time to talk about time management.
 - Check the accuracy of the clock in your classroom.
 - If you don't have a clock, find an unobtrusive way to keep track of the time. DO NOT pull your cell phone out of your pocket in front of your class.
 - Set a watch or phone alarm if you absolutely have to so you can let your students go.
 - When you write your lecture notes, put estimated times down so you can stay on track.
 - Make notes about what took more or less time than expected so you can adjust in the future.
 - When planning lectures, always give yourself a little bit of grace time in your estimations.
- We ended with a short discussion of the importance of learning students' names. This is important because they believe you care about them and because you can keep a better eye on which students, if any, are leaving class early or behaving badly.