Knack

Student/Parent

Seminar

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**Introduction**

**Hello, m**y name is Nicholas Cragg, and I'm here to talk about organization, and math, and getting students more involved with their education outside of the classroom.

I want to start by claiming to possibly be the biggest nerd in West Vancouver, save my twin little sisters.

And a little administration, I would just like to say photography, and filming, and texting, and leaving the room to talk on the phone, are all totally okay.

I was the last class at Hillside in 96' and the first graduate from Rockridge middle school in 98', and graduated West Vancouver high school in 2000.

My math 12 teacher Miss Rowley, who is now the vice principal at Sentinel, traitor, was actually taught by my calculus teacher, Mr. Klassen.

Just down the hall in Room **206,** before Ms. Rowley would hand out the tests she would announce the winner either Michael Lenic and the front of the class would cheer or Nicholas Cragg and the back of the class would cheer.

My full-time job is a professional math tutor.

After I finished my commerce degree in finance, at the Sauder school of **business, I** began building financial models for a real estate company.

It turns out there wasn't enough **interesting** math.

So I went back to the drawing board, and continued working **construction with my uncle and cousins,** as I always have in my in between times.

As I continued to look for other **work, Mrs** Hathaway, the counselor at West Vancouver high school at the time, recommended me to see **a Tutor** on the North Shore name Michael Mustard.

As he let me sit in during his sessions I not only brushed up on material I would be teaching in the future, but also realized different ways of thinking and teaching based on different students needs.

I have been tutoring professionally ever since.

It turns out my passion for math, ability to recognize different students learning types, and to relate to students of all kinds, that many of my students have not only done much better in math, but have also gained a new outlook on life

Here is a quote from a parent of one of my students. I started tutoring him in grade 9 and continued through grade 12.

“Your assistance with Mitchell was nothing less than outstanding. I would always think of you first and foremost if someone were looking for a math tutor. Mitch and I leave for Western at the end of the month, not sure if you know but he has also received acceptance into the Richard Ivey school of business. Much of that I have no doubt was from your work with him.”

Mitchell - Richard Ivey School of Business

**Before I go into it all, I just want to say, if I sound at all diminishing towards the educational system on any level that offends anyone, understand my intentions are very positive, and I am very fond of it.**

**Mismatches between teachers and students**

I want to mention a story about my first year at University of Victoria.

I hope this story helps the people who have had minor difficulties with teachers, because we’re all human beings and sometimes students and teachers don't connect, and parents and students don't know what to do. I will tell the story and then tell you my point after.

One day I walked into my calculus class, the engineering calculus not the business calculus, I sat down front row center as usual.

My professor walks right up to me and says, didn't you get my email. I don't even think I had email at that point. I politely said, no sorry I didn't.

She then explains how I have been kicked out of her class, and I have a meeting with the Dean of mathematics in 15 minutes.

As I walked with my tail between my legs up the class walkway, all my friends laughed as I pondered how I could have had such a bad effect on her.

I walked into the Dean's office with my head down and sat in the chair thinking I did something so bad I may get punished. When I looked up this man was smiling at me, and as it turns out the Dean of mathematics was my first term math professor and he absolutely loved my antics in class.

I only call them antics because to someone who didn't understand my intentions they may seem a little offended.

What I would do is, do all the homework before the class. Then I could question the teacher's methods while they were doing the homework on the chalkboard. It turns out she didn’t like my methods.

Long story short, he took me into his math class and scaled my grade up. He also put me on the Dean's list which is one of my most treasured pieces of paper. (Smile)

That is the end of my story.

If you or your son or daughter is having trouble with a specific teacher and they can't get out of the class just remember you never really know. The way my professor kicked me out of the class I thought that I had offended her and I may have, but the Dean's response assured me that sometimes you just have bad teacher student connections, and you may not be as lucky as I was, so you have to do whatever you can to get through it, and not put so much stress on yourself or child because they're not doing well in math right now. If you take math enough years in a row, and you want to do well in math, you'll find teachers who you or your students will connect with.

**Inefficiency in teachers notes and text books and not giving back tests to take home**

There is a large problem in teachers notes and textbooks today.

Because there is such a large number of methods meaning, different ways to do the same math problem, and how students go from teacher to teacher learning different ways is to do the same thing, unknowingly causes a serious problem for students whose teachers don't recognize that fact.

Teacher worksheets are usually poorly laid out usually created by using subpar software, but also ineffective to some degree, as there is a huge problem with smart math teachers with limited extracurricular time creating material: they create material on a one-time basis without consistently updating and simplifying the material based on student needs and requests. The progression of questions is usually rushed, with gaps from easy to hard.

Teachers usually assume students can do quick methods based on previous years' experience whereby only needing a small amount of room on the page to solve a problem.

This is usually not the case.

Students aren’t even allowed to take their tests home. A little ironic. The only thing that actually shows them how they did at exactly what they were preparing for. They get to see them. But that’s not enough. This is obviously for sharing reasons but moreover the teachers aren’t paid enough to create new ones every year. The fact is their is only limited funds due to taxpayers when it comes down to it.

The problem with textbooks, especially in public schools, is that in order for the textbook writing company to be efficient and economical, it requires some 30 authors, **which is extremely disjointed.**

These textbooks are designed for students with difficulties, all the way up to advanced placement students.

This causes for an overwhelming amount of stress for students who are just trying to learn basic concepts to a point where they never actually read the material, but only flip to the back section for questions. This could be replaced with a much more economical system of handouts and video solutions which many schools are adopting; however, is accompanied by a large initial cost and for individual school's math department to create this material. It's getting better.

I will continue to make material in the form of notes and homework, primarily based on other teacher and textbook material, but most importantly continue to edit that material while tutoring, with respect to page layout, and available space to do questions, and most importantly the progression of questions.

I believe that if students have the right progression of questions, and are willing to put in the time, any student is able to learn anything and it is usually in the fault of the presentation, or surroundings, rather than the students ability.

In the future math material will be free, in a multitier paper-based, website, and **video form** where teachers will simply follow along a video feed coupled with paper based fill in notes, where they pause for student questions to clarify concepts.

We are not there yet.

**Students learning on their own**

Another problem with the educational system, is that students are taught to do specific steps very similar to the workforce today.

Teachers don't have enough time, and students aren't interested enough in learning the concepts, and rather just the steps.

Students outside of class are so infused by technology and social media, they do not have time to think about the concepts.

It's not cool anymore to answer a math question.

At a party I was at a friend of mine Mark Ellis had a hipster calculator watch on. My stockbroker friend Ben Curry challenged me to a two digit multiplication competition which I digress he won, but we had the music turned down, and both sides of the party cheering.

I will forever try to have my students bring math into their lives more often, whether it be counting on their fingers or solving problems.

Students using math in their daily lives on a very minimal scale is very underestimated.

Simple calculations such as how much gas does it take to drive a kilometer, or doing a simple calculator or long division calculation of the percent grade they received on their test, or if you shoot a bow and arrow at what angle should you shoot it to go a certain distance.

The more they do these simple or not so simple calculations the more there brain will find similar ways to solve their daily work and life problems.

When I tell my students I learn the math before the teacher taught it they are always stunned. This ability did not come overnight. I continued to dislike the way teachers taught things forcing me to learn it on my own.

This was a very difficult but extremely satisfying process

Forcing yourself to try and try again until you get the right answer is a learned ability.

People think it comes innate, or you may have a knack for it, but it is the feeling of solving that problem and again in the future, and the positive feeling it comes along with it until, the mind frame how can I solve the problem is the first thing that comes to mind.

Most student’s first response to a math question is stress, and the idea to ask someone what should I do. I would like to build a mind frame for students to have a more positive outlook such as how are these numbers related, or what is this problem similar to that I have solved in the past.

**Memories**

A little background about me.

On top of my job scooping ice cream and dishwashing at nights in horseshoe Bay, I received a volunteer position in grade 9 as a senior at Rockridge at the time, to tutor the grade sevens and eights. This was great because I didn't have to do sewing class.

But all joking aside, I learned to count with my fingers by addition, subtraction, and multiplication since I could barely talk. I was lucky. Its never too early and it's never too late to start bringing math into daily life, which I will be talking about later, you just have to find the right motivation, or the right motivator.

Tutoring younger students at such an early age not only helped the **students learn, but also** my teaching ability and my understanding of the math, and how different people learn in different ways. I was always the coolest kid at the library. Students would always ask for all my notes and study sheets.

My cousin Damon was awarded a physics and chemistry award in grade eleven right here at West Vancouver high school.

At an assembly at Rockridge, the principal Mr. McMaster at the time was announcing the winner of the gauss math contest. The average across Canada was 18 out of 50 at 36%. And Mr. McMaster said and the winner is, oh my it's a tie with a score of 32 out of 50, Emily and Jacquelyn Cragg please come pick up your awards.

For that and other reasons one decided to go be the best at Sentinel and the other at West and high. With my oldest sister Carys, and me.

Who gets valedictorian when you tie.

My little sister Emily not only caught up to me at the sauder school of business, but on the newspaper article I have on my wall at my office, has me with the rest of the 530 graduates who all had to get 95% in math 12 to get in, and Emily is sitting top dead center Ralph Lockmark Medal standing third in the graduating class. And everyone knows in the graduating class first and second did accounting and that's not truly first and second when Emily did finance, with me.

My grandpa used to take us for report card dinners where my three sisters and I would pass around our report cards for my grandpa's approval. You don't know what it's like to have your report card reviewed by a Rhodes scholar. I keep my report card from high school on my wall at my office, beside all my transcripts, and take pride in my 50% in calculus 12. I like to express to my students that if you don't try no matter how smart you are it's not going to happen.

And on my other side, I can't count the number of times that someone has said to me, your grandfather or dad, delivered me or my kids.

Before I close my little history of myself, I would like to talk about one of the last memories I have with my late father. My dad was always running around as he was on call at Lions gate, I know because I have this scar on my forehead which he stitched up on the street and continued to one of his calls at the hospital.

In this story we were in the University of Calgary library at time I was eight years old and bored as my dad was reading orthopedic surgery books where I happen to find a dictionary with the letters on the side and I proceeded to learn the Alphabet backwards.

Z YX WV UTS RQ PON MLK JI HGF ED CBA

I was a very lucky child as I had tons of time to think stress-free. Students are so caught up in daily stresses, and their peers, and they don't have as much time these days without all the distractions to focus 45 minutes of their time to learn one of many skills that enhance life.

This story doesn't have to do with learning the alphabet backwards as the application isn't very useful.

The larger point of this story is the higher level of ability for students to learn things when they are in a minimal stress and **distraction** environment.

Let me explain a single concept of the relationships in math.

5×10 = 50. Now let me count with my fingers to make sure. 10 2030 4050.

50÷10 = 5. Now wait there must be a relationship between multiplication and division.

Students who take the time to think on their own and recognize these relationships are going to do much better in later math, whereby always being able to check their answer by doing the reverse operation.

**Efficiency overview**

So for the past six years and probably my whole life I've been noting down things to do more efficiently when it comes to schoolwork or any work for that matter. It will take some time to implement even some of these techniques so I'm just going to tell you all of them, in my borderline ocd fashion, and you decide on which ones you'd like to implement on which timeline.

You obviously won't be able to do them all at first but it is about implementing them slowly where students see their benefits.

And, to all the students who see other students do well in math and say, they’re smarter than me, I say you have gone to the gym for the first time and are trying to bench press 200 pounds. What would you tell a person trying to bench press 200 lbs they’re first time at the gym. Start lighter! Those “smarter” students started “lighter” when they were five years old with math workbooks luckily bought by their parents. It takes time. And once you’re fit, in your brain, its going to take a lot less time per week to, exercise your brain, than it is going to get you fit.

**Why math**

The most common question I get from students is why math when I have a calculator on my phone in my pocket. I first tell them their brain is so much smarter and faster than their calculator may ever be.

I then proceed to tell them the following 3 and a half reasons.

The first is Exercise for your brain:

Like running on the treadmill or swimming laps to keep your heart race rising and muscles moving and air flowing.

Your brain needs exercise just like any other muscle. It needs constant movement and fluid and air at all times. Today, the amount of logic, and on the ball thinking, are much less required compared to previous centuries. Hunting and gathering would have required an extreme amount of endurance and alertness whereby we substitute exercise and brain activities like math.

The second is:

It's really too bad the economy, and values, and student interest and discipline today is much below past averages that we don't have enough money to fund teachers and classrooms. Social and Economic forces lead to the cheapest way of finding out who is smarter than the other.

The third is:

To do higher-level math where I try to bring in jobs such as computer aided Nintendo, or fashion design, or triangles in carpentry, or simply so they may get the promotion at work quicker, or to win a two digit multiplication competition at a party.

And finally because maybe you could even start a business teaching the subject.

Doing math in general inside and outside of the classroom enhances problem-solving abilities.

Just like languages, dictionaries and words help people not only solve problems in their daily lives but also between other people.

Some say the written word was one of the greatest achievements of humanity.

I think it was the written number.

**Course Planning**

Now this will be a short section but some of the concepts spread throughout all student needs.

Students and parents are always asking me what math course I should take next year.

The overall decision is based on what math courses you'll be taking in the following years and goals for future employment.

There is nothing wrong with taking the easy math. Now I'm not saying it's not great for students who are able to handle the stress and workload by all means get it over with so in your grade 12 year you can focus on your core courses for university applications

But there's nothing wrong with just postponing the harder math for after high school.

In order to graduate and do basic necessary mathematical calculations such in carpentry or fashion design students must take math eight and nine, precalculus 10 and foundations of math 11.

Students who would enter programs such as psychology, law or teaching, students must take math eight, nine, precalculus 10, and precalculus 11.

Students who enter programs such as engineering or business needs to take math eight, nine, precalculus 10, 11, 12 and depending on the University, to take and pass, or achieve a good grade in calculus 12.

Calculus 12 is one of the biggest questions I have from students and parents and my answer is always:

First:

Does the program in university require a good or a passing grade in calculus then of course it is obviously necessary and well take that case off the table.

Second:

If calculus is required but is going to affect the other four provincially examinable courses whereby not gaining entrance into their desired University even if it's not in their optimal field of study at the time students should not take calculus because they can always take it in first or second year and attempt to transfer into the program of their choice.

Third

If calculus is not going to affect the other four provincially examinable courses take calculus.

First year calculus was brought mandatory into the high school curriculum in my graduating year. West Vancouver high school decided to give passing grades to any student who attended every calculus class throughout the year. Now I regret not trying, although to get 95% in math to get into commerce at the Sauder school of business is difficult enough. My regrets are not too strong, but nonetheless at least sitting in Mr. Klassen's class hearing him yell calculus words and concepts to us allowed me to at least have an idea of the scope of the class much more preparing me to take it again in first year university, which was already stressful enough.

**Binder organization**

The most important thing about binder organization is dividers.

Also students who have difficulty with math should have a binder devoted to the subject. Students always say but the binder gets to full, whereby students should have an identical, with respect to dividers, an at-home binder where they take some of the material out.

Students always have one divider for math and one for each other subject.

Students always say what do I need more than one divider for math for. My answer is because math is not like other subjects where it builds upon itself and in order to solve problems sometimes one is required to flip to their notes section to follow certain steps.

There is a large debate on whether or not to have homework directly behind the notes or in a separate section. It is convenient to flip to notes the page before, but outweighing that convenience is the following reasons:

The size of the note section is so much smaller than the homework section. Because of this fact, and students constantly taking stuff out of their binder, it is more beneficial to have a separate section for notes which stays in the binder all year.

Having a note section also allows the students to more easily gauge the amount and scope of material necessary for a test.

As many methods reoccur across math topics, it is also easy for a student to flip back just a couple pages of notes to find the necessary information rather than flipping back through notes and multiple pages of homework to find what they're looking for.

This last point is underestimated as it causes a fear and stress level in a student whereby they almost give up on the system altogether.

Now this quote should be taken with a grain of salt as any but:

Edison said, if it's something that can be written down it is not worth committing to memory.

Supposedly Edison had one of the greatest archives of notes and information in his time and his system of organization with respect to recall, trumped the greatest libraries.

Before I get back to dividers, exciting I know, I will talk about the only binder I would ever use.

There is a binder at Staples named “heavy duty” with the following features:

A clear insert on the front and the back. This allows students to have a monthly calendar on the front and back with important dates such as tests and assignment due dates. If a student has more than one binder then only dates for that subject would go on those calendars.

Double clear inserts on the front and back inside as well. Students have so much un-hole punched paper a more secure inner pouch for more important information and an outer pouch for more easily accessible information.

The way you open and close this binder is with one finger which is not only very ergonomic but also helpful to students with difficulties. This binder system of opening and closing forces students to use it.

Here is an example of a bad binder and the difficulty in using subpar opening techniques and the problems caused by this. **A student will respect of better binder system and attempt to use it in a more systematic fashion.**

**Opening the binder with the** center rings causing damage to the ring system itself, but also further damage to three hole punched paper roughly passing the damaged rings further causing damage.

Students should also learn to flip sections of paper with both hands as this causes less friction between the three hole punch is and the rings. Especially if a divider is the leading page in the page flip than lightweight paper.

Throwing backpacks is also damaging to the binder system but I don't have all night.

These binders are only a couple of dollars more expensive but will last even into following years and allow for the students to have a more neat and organized binder system.

So back to dividers:

The student should have the following 4 sections in their math Binder.

The first section for the syllabus, test concept checklists, goal and grade sheet's.

The second section should be for review which includes taking notes on notes and doing review sheets for the test. This section is so underestimated. Just the act of writing English sentences of mathematical methods required for a test echoes the students ability to recall and focus and simplify an already very daunting topic.

The third section for notes. This section should be for students teacher notes and personal notes. This section should be referred to while doing homework. Notes in this section should not be removed any time during the year as overflowing binder homework should be taken out into the at-home binder.

The fourth section is homework and the fifth is graph paper. With a clear insert at the front with paper inside for easy access.

I cannot stress the importance of using heavy-duty graph paper for all mathematics. The cost is far outweighed by the value. Not only do students pages 3 holes rip more frequently but the graph paper is better than lined paper so why not. Also for geometry and graphing and page layout and everything.

The math Binder should attempt to replicate the students brain and how they **recalled** math information whereby actually remembering where something is in one's Binder and how they flipped to it all the time makes an actual connection in the student's mind to remember that more easily or quickly which a digital file folder system on an iPad for example could almost never be replicated.

Digital storage file systems do not allow a student to gauge or scope the amount of material required for a topic. They are absolutely a great resource for solutions and video and collaboration which a binder cannot do. **Yet. Digital paper will be the next big thing. 6 pieces will be a big screen TV on your desk.**

A little bit about student workbooks in the form of three hole punched coiled books:

Students always say to me but it keeps everything in order.

I always cringe at this fact.

It completely disrupts the ability to have a note section and just as important the ability to take out pages from previous sections to be kept in an overflowing binder for later sections and years.

**Just the fact alone that you're carrying so much extra weight at the beginning of the year with all the unnecessary pages but furthermore when you finish one halfway through a topic that means you must carry both the old and the new around for a period of time across many subjects this can get very problematic.**

I always have a debate with students which I lose every time unless they are interested enough to watch my demonstration.

This debate is over whether or not to put new information at the back or the front of the binder.

Most of my students put information at the front. It seems so logical it's right there when you open it up so why Not. This is a problem in its own right because you start writing on the front of the page and continue to the back anyways.

Demonstration:

As one tends to have more than one page of notes and homework for a given day the following problem happens. When forced to study for a test the student flips to the back of their binder and then unnaturally flips the pages to the left.

But moreover due to having multiple pages per day when a student is flipping to the left there actually flipping to the left and then to the right and then back to the left again to find out where they left off then past that and then back to the right etc.

Now I'll demonstrate a properly organized binder.

Also when old material is taken out from a section and putting it into the at-home binder this magnifies the previously explained problem as now the different sections are so backwards I can't even conceptualize it.

**English Sentences**

A very brief example of English sentences and notetaking is a great example of,not only how students learn, but also are so different in how they think about their memory and the way their brain works **and believes it will recall memory in the future.**

When I'm working with perimeter for example.

I say to the students if the army man says secure the perimeter what do you do.

They say go to the outside.

I then say so we are going to add all sides of the shape. So for example let's take a square with side length of 10. 99% of students say 10 x 4 = 40. **A handful** of the students write down

p = l +w + l + w

and then add the four tens and say p=40 and write down perimeter: add up all the sides.

I cannot emphasize how much better the students who do the latter do on tests and following years of math. Following students through their mathematical education over many years has forced me to believe just the act of writing English sentences, showing more work, doing better on tests, causes a greater positive reinforcement to continue with the habit will continue into university and work life

The students who just write down 10x4=40 usually confuse other formulas like area which involves multiplication.

It also more easily allows students to follow their previously taken notes and finished homework. Writing 40 doesn’t even say what the question was asking for. 40 elephants.

But scanning the page more quickly seeing additions like 10+10+10+10 = 40 under a properly formatted formula and English sentence does so much for the foundations of doing harder level formulas in the process of substitution and relating one of the minimal high school operations of addition subtraction multiplication division.

**Calendar**

The student should not only use a binder reminder but also a monthly calendar on the front of their binder as explained previously.

If a student does use a binder reminder only the subject section and the word math should be written whereby referring to the syllabus for required questions.

Students should also have a rough estimate of time allotted for certain subjects throughout the week outside of their work, sports, and social lives. This estimate should be given an hourly amount divided into appropriate weekdays.

Brief journals in a binder reminder or calendar of the time spent on the task will more easily allow a student to gauge how much time they are spending on each subject to more appropriately devote time to subjects in the future.

Students should also have a brief single sheet financial plan which takes into account amount money either made from work or received from parents and approximately how it is spent with respect to necessities and sports and obvious others.

Students have so much stress already it is nice to know for them if they will have enough money for certain events or problems for example in the future to minimize the effect caused to their ability to handle their workload. This is also a good exercise in preparation for University and work life.

Technology should be brought in slowly as a hybrid of analog and digital for calendar organization.

**Page layout**

Making titles more simple for students to write down more easily, motivates the student to actually write clear meaningful titles at all.

Instead of writing mathematics eight chapter 4 section 4.1 polynomials page 82 a student should write:

M8-4.1-Poly p82 (This doesn’t have to be perfect)

As students are so neglected to write their names and dates on pages I always suggest just initials and or the date in numbers such as NC 2/5. now mind you teachers may be a little bit annoyed but it should usually suffice for handing in homework or retrieving a lost binder.

Students fail to realize how important titles are. Not only being able to see names of topics over and over again but also in the process of writing them and being able to more easily refer back to old notes necessary for overlapping section's and most importantly if any necessary information needed to be taken on to following grades this process is so much easier.

Also as a teacher I am more able to refer students to certain sections to allow them to do questions either when I'm in front of them or when I'm away from them. The current system of notes is in such disarray that teachers have almost given up on referring to previous sections and repeatedly showing students how to do things which causes for an overwhelming overlap of notes in their binder continually decreasing the value of the system.

I was at a basketball game at GM Place with my cousin in my graduating year and my car was broken into and my backpack and binder were stolen but I thank the Lord for my beautifully written notes and titles on all the pages my binder was found near a dumpster and returned to my school. I guess the thief thought it was too beautiful and important to someone to throw it out. I didn't have it for a little while which caused a great deal of stress but it allowed me to put importance on things such as photocopying information as the process is so simple and so rewarding in case of disaster. Other students at school called it the master binder, in a supremely organized fashion over years of practice and most importantly failure in methods of organization causing to learn new and better ways.

If you wanted good notes I was the guy to copy them off of.

When I'm teaching there is this time that my students always mimic what I say.

Now I first knew I thought differently in University when I would explain how I thought to someone and they were marveled at some of the reasons behind it.

So the next thing I'm going to say please disregard from your brain immediately

It is the formula for a method in calculus 12th called product rule:

I am yet to find a textbook which teaches it the way I think nor have I ever found a problem from a mathematician on the difference

Derivative of the first times the second plus

The first times the derivative of the second

Derivative of the first times the second plus

Derivative of the second times the first

Just the visual alone but more importantly the way it's written as poetry more easily allowing the brain to remember the process with more similar sentences.

This is a thing that my students always mimic me saying:

Down the page keeping the = in the same spot

Down the page keeping the = in the same spot

When working with things on both side of the = it is important students are working with an analogy of an old-fashioned scale or teeter totter. If you do something to one side of the equal side you must do that same thing to the other side of the equal sign This is the golden rule of algebra and in so many cases forces students to see the next step.

I won't go into the technicalities of it all but more and more textbooks are using this protocol of working down the page keeping me = in the same spot because it allows students to always have in the back of their mind the golden rule.

It is also much easier for a student to refer back to notes taken a while ago seeing the steps they did. It is also easier for their peers to follow their notes, if they are so inclined, and more importantly allows for teachers to more easily mark tests and homework which causes them to give way more halfmarks as they get back to their own lives more easily. Any teachers out there marking oh man.

The let me give you an example of

keeping the = in the same spot working down the page

versus otherwise. The fact that it does not require more work and usually has more benefits I usually force students to follow the protocol.

Keep in mind 2+2 = 4 and going to the right is totally fine but when working on equations students must work down the page.

When working with two formulas at a time students should write both equations side-by-side as 100% of the time at some point one equation is required to be inserted into the other whereby easily seeing clear columns of steps completed and know the exact moment to put one equation into the other. Furthermore this allows for students to more easily be able to follow steps when referring back to previous work to do harder questions in the future.

Now I'll give you an example of a well laid out page and the bad laid out page and the benefits and problems.

Skipping lines should also have a reason.

If students skip lines because their writing is too big to start on the next line, then students should skip two lines between questions. Students should always skip lines between questions and concepts to much more easily follow their notes. Skipping the appropriate amount of lines also allows for students to review their notes more easily, but also their peers and their teachers for reasons mentioned previously.

I always say students with any difficulty in math should only do questions on the left margin, with the question number and letter way to the left in the margin away from area necessary to do math and possible confusing numbers for easy revision.

The reason why numbers and letters should be put away to the left of the margin is because many operations required in math require the space to the left of the start of the question.

When reviewing, these numbers and letters will not get in the way and you can much more easily see where the questions are on the page.

(= eg)

The page should be visually divided into two sections.

This obviously does not have to be perfect by any means. So we have two clear sections.

The right side of the page should only be used for formulas and English sentences of mathematical steps taken or things to remember commonly forgotten by students.

Now here is an example of a nicely laid out page.

As you can see it is easy for students to review their questions only. It is also easy for students to scan necessary formulas required for tests.

But most importantly is easy for students to find written in English, the mathematical steps necessary, because the more students do this act the more they realize how they continue to do the same thing over and over again. But under stress without any English instruction for remembering in the future students are less likely to remember and focus necessary steps for a test.

(left right side page)

I cannot stress how important this last topic it's. Writing neat notes allows for students to infinitely better recall necessary information.

Now you may think this to be wasting paper. I will never win this argument with students. But after enough years of following this two column system students realize how much less paper they use as instead of mindlessly doing question after question they are so much more able to focus the scope of the necessary methods.

Students who follow this good example of writing English sentences are so much more likely to be able to recall the information in the future then students who follow this example.

**A brief bit more on the misconception of wasting paper**

Students think that cramming questions onto both sides of the page saves paper. I want to explain why this is a fallacy for the following reasons:

What students fail to realize is that math builds on itself. Textbooks and teacher outlines are designed so what you learn in previous chapters you need for more advanced chapters.

If students would simply do questions on the margin leaving the right-hand side of the page only for brief notes about the questions, so when doing harder chapters they can refer back to an easy to read and easy to follow page layout.

Students get so stressed about their homework that they just mindlessly continue to do questions over and over again whereby actually using more paper than having a functional note taking system in place.

By not having to mindlessly do and redo questions, especially for overlapping material a student will actually use less paper reading their own clear notes when doing harder questions or overlapping material in the future

Let me show you a brief example of what I'm talking about.

When studying for tests it is advantageous to take out the 10 pages of notes and lay them flat on the dining room table while studying. When writing on the back of pages forces the student to have to consistently flip pages to look for notes on how to do questions. This causes stress and inefficiency which causes the note system to fail completely whereby students continue to do random question over and over again never understanding there isn't so many things that you can do in math.

I know this seems like wasting paper. But there are so many reasons why writing on one side of the paper is advantageous.

Only writing on one side of the paper also allowed me to way more easily bring simplified focused methods and problems from previous years binders into future binders.

Writing on the back causes for the necessity to bring unnecessary information to further grade binders.

Being able to lay all of your notes out on a table is advantageous without having to flip pages over to see what is on the other side being such a already stressful system

(10 page)

I strongly suggest writing notes on one side of the paper but as homework over flows the binder writing on both sides is acceptable

**Duo tang**

I always request to my students to and have an extra resource along with a well organized binder such as a duo tang.

This allows for easy access to formula sheets or possible English sentences or anything students would like easy access to when already overburdened with so much material in their binder.

It also allows for a quick ability to easily pull the duo tang out and review in a time like being crammed on the bus or possibly while walking to school studying for a test not wanting to hold the whole binder

**Calculator**

The number of times a student says to me, “what do I need a calculator for” or “what do I need to know simple calculations such as multiplying decimals or long division when my phone has one which is always in my pocket.”

Now I'm all for students learning to use the calculator on their phone properly, and how it helps in education and work life. But this fact alone causes me to worry a little about the future brains of our country.

Technology obviously allows people to live more easily together and have better lives and I haven't studied this topic at length but, I believe our ability to think in the future is diminished by having some of these aides.

First of all most students aren't allowed to use their phone calculators because teachers recognize the fact there are apps on the app store which can solve problems with solutions, because they have the ability to search on Google, and most importantly access and transfer text and picture messages without the teacher hearing the sound.

There is even an app which offers a ring tone for text messages which human beings over the age of 25 cannot actually hear the frequency of the sound waves. I had to call my partner and his student over and we all confirmed students could hear this tone whereby adults couldn't.

We even did a quick Google search to confirm this apps truthfulness.

Most importantly a calculator is something a student should get used to.

Muscle memory of pressing buttons and calculator layout and functionality staying consistent through grades is optimal for students.

If a student is going to be taking higher-level math they should get that required calculator as early as possible.

I remember when we weren't allowed graphing calculators on certain sections of the math test whereby we had to use scientific calculators and I realized the major differences between them and the problems caused solely by looking for buttons or accidentally coming to the wrong answer by not understanding how brackets work for example.

Now I would just like to show you an example of problems with calculators and knowing their individual idiosyncrasies

Calculator example:

So this is one of the most inexpensive and popular calculators at Staples and among students.

Now when I press -3 squared the calculator automatically puts brackets around the -3 meaning -3 times -3

These automatic brackets are usually not the intention of students

Now let me give you an example of what it should be doing based on the buttons entered into the calculator

Written response:

-3 squared means and negative in front of three squared which means 3×3 = 9 9 which means -9.

The negative is not being squared

-3 in brackets squared means -3 times -3 and two negatives make a positive so the answer is positive 9.

There is a supreme difference between the two, and students who simply mindlessly enter things into their calculator and use different calculators such as an iPhone usually make mistakes unknowingly their calculator is performing these functional operations in its own specific unintended illogical way.

Here is what a normal calculator should do.

**Math in every day life**

I was lucky to have math brought into my life at an early age and surrounding many aspects of daily life

As I mentioned earlier I was first taught to my add and subtract with my fingers by counting. Then working to count by multiples to more easily learn my multiplication tables.

The importance of bringing math in as soon as possible I cannot stress enough but also that it is never too late

On road trips my sisters and I competed to see who could calculate distance or time to a destination given a speed.

In elementary school I would do long division as an estimate in my head to see the percentage I received on the test.

Now let me show you an example of the calculation going on in my head.

In high school when I had a calculator I would do the simple division on it

Doing this repeatedly on homework assignments and tests across all subjects allowed me to not only have a better understanding of my current grades but also allowed me to recall how similar the calculation is in all sorts of daily life

**Student bootcamp**

Taking good notes and clean homework along with a well organized binder is paramount in learning math.

Students not only need to be doing these things on a regular basis but also having a list of things they do outside of their binder

I will now go over the list I like to call boot camp of things students are supposed to do which they refer to often maximizing their efforts

Note taking

-Take good notes in class, Use good page layout, Take notes on notes that night

-Use a binder reminder

-Use a duo tang.

-Make sure a clear separation between things to do such as meeting with the counselor and reoccurring things to do which I like to call boot camp such as homework or test review.

Daily

-Organize your binder and duo tags

-Spend at least five minutes a day practicing math questions

-Think about math every day

-Think about how what you're learning applies to your daily life

Homework

-Doing homework, Read do homework, Do extra questions

General math

-Draw a diagram.

-Write down what you do know about the question, Sum up the information.

-Come up with a similar simpler example to help answer the question.

-Ask yourself what else I could do

-Check your answer, Use logic to determine if your answer is correct

Study for tests

-Study notes and homework, Do practice tests, -Create practice questions

Test preparation

-Ask the teacher the format of the test. Short answer long answer and word problems. Multiple-choice matching etc.

-Any formulas given on the test. Any non-calculator sections

-Create cheat sheets. Study notes. Take notes on notes. Do homework. Redo homework and teacher questions. Do review packages.

-Ask the teacher for extra practice questions. If they don’t have any ask the math department. If that doesn’t work find a open teacher website or ask another teacher from another school.

-Do practice tests.

-Get a good sleep and eat breakfast and have a snack for the test. Bring a water bottle

Test taking skills.

-Be calm and breath.

-Write down any formulas you remember from study material.

-Quickly scan the test.

-Do the questions you know how to first.

-See if any other questions jot your memory on how to do other questions

Extra marks

-Retests. Test corrections. Homework makeups. Bonus marks.

-See the teacher regularly for help as they will portray test attributes

-Study with friends forces you to explain a topic to a classmate

-Tell someone what you have learned that day

Tutor session/Teacher help session

-Arrive early to session and begin studying

Layout homework, Do parts of questions you can, Leave room to finish questions

Have questions before the session

Inventory

Binder, textbooks, duo tang, pencil case, calculator, pencil, eraser, paper, highlighter, dividers, pen, ruler, sticky tabs, white out, at all times!

**Good Sheet Layout**

**Bad Sheet Layout**

Page layout

-Title page on title line: a capital letter of the subject, your grade, section and topic.

M10 3.3 Volume.

-Initials and month/year in top right hand corner. Circled page numbers again in top right if more than one page on that day.

NC 12/25 (1)

-Question numbers and letters are to be both to the left of the margin. To the right of the margin is for single questions to be done.

-To the right of the questions is only for formulas things to remember English sentences and anything particular to each individual student which they need to remember or work on.

-Don't skip lines while working on the same question. Skip line from working on a new question.

-When starting a second part of the question either do it to the right of where you started the first part of the question or where you end of the first part of the question so you and others know the order which you did the question

-Write methods and things to remember to the right of your work

-Don't start a question near the bottom of the page where you may run out of space and have to continue on to the next page

-Circle your answer

Beginning of class

-Take out a new sheet of graph paper title name and dated appropriately notes

-Keep your binder opened in front of you for reference

-Take another sheet of graph paper title name and dated appropriately homework

-List the homework from the syllabus and start doing questions while the teacher gives notes

New homework

-Write new homework on a fresh sheet of paper at the top with the title and instead of in your binder reminder have a boot camp list of things to do including math homework which you check the back page of your homework section to see if there's a page of questions need to be done

-Circle the part of the question that you're working on, write it down on the right, solve it on the right, and substitute it back directly below where you circled it and bring everything else down

Study area

-Area for an open binder for notes. An open duo tang for formulas etc. area for an open computer and access to a printer. And an area for an open textbook. And an area for the actual homework to be done. This is about a 3' x 3' 9 ft.² area.

Studying

-Take out a new page of graph paper. Have your binder open to notes. Have your textbook open. Have your duo tang open to the appropriate formula. Have your computer open to the teacher's website.

Binder management

-Use two hands to flip sections of your binder so that pages don't rip on the prongs and so the prongs don't adjust to further cause problems

Erasing

-Large erasers are made for large mistakes

-Small erasers are made for small mistakes

-Turn the page sideways and vertically erase between your index finger and your thumb

Calculator

Lay the calculator flat on the table. One loses focus placing their pen down and moving their hand from where they were previously learning.

Binder organization

-Heavy duty Avery Binder with clear plastic front and back and double clear inserts on inside and ergonomic single finger finder opening.

-Section for Math miscellaneous. Special section for notes on notes. Section for notes. Section for homework. Section for graph paper.

New material

-To be put in the back of the section so in case of multiple pages per day one may start at the beginning of the section and read to the right logically and chronologically the order in which they took that material. If new material is put at the front and some days have multiple material you will not be able to flip through your material chronologically without getting interrupted.

**Parent bootcamp**

Doing Math Every Day

-Attempt to have your son or daughter spread their math homework and studying for test over time rather than cramming.

My studies show students who do their homework the day they learned the material will more easily allow them to complete their homework when the information is fresh in their brain, but also like exercise, doing a little each day is much more efficient and effective than doing it before the due date.

Binder Organization

-As a parent you should have a rough idea of how your son or daughter uses their binder and binder reminder.

-For example do they have a notes and homework section.

-Do they put new information at the front or the back of their binder. Do they have a syllabus, giving a rough outline of homework and test dates.

-Do they use a binder reminder for homework due dates and test dates. Analog and digital technology should both be used as a hybrid calendar organization.

-Do they title and date their work and do you know how to efficiently make sure it matches their syllabus, binder reminder and page dates.

Planning

Organizing time is one of the largest problems facing students and the work force today.

-With sports, and work, and social lives, along with work and university preparation can be challenging even for the most interested of students.

-Taking time to sit down with your son or daughter to roughly plan how many hours they have to spend on each foresaid topic will help for necessary future planning but also minimize stress levels on students which is one of the largest factors allowing them to think more clearly when doing homework or in a test situation but also allows them to relax more in social environments.

-Ask your son or daughter what they learned today. You don’t have to understand what they teach you,

Just having them explain what they learned, or what they are having difficulty with, improves their left-right brain thinking, but also allows them to review the topics by explaining it to you and also allows them to more easily have an idea of what they know and how well they know it or not.

It also forces them to review the math they learned everyday on the days they are not doing math homework.

Administration

-Make sure your son or daughter has all the equipment necessary including

Heavy-duty binder. Purchasing an inefficient binder is not only unergonomic but also unwillingly damages the content inside.

Lined paper and graph paper. Higher-quality thick paper is well worth the value. It lasts way longer and contribute to a more organized future.

The following are all necessary as well. Dividers, pencils, pens, highlighter, erasers, rulers, compass, calculator, and any other necessary material for mathematics.

Make sure your son or daughter has access to the Internet and a workable printer at all times.

Make sure your son or daughter has access to a computer and if necessary a signout sheet to multiple siblings organizing computer time.

Make sure your son or daughter has an ergonomic backpack large enough to carry binders textbooks lunch and clothing.

Study area

-Make sure your son or daughter has ample space for their binder, textbook, duo tang, computer, food, water, and homework paper area. Closing your binder to do homework is like throwing away you’re tool box before construction, or you’re sword before your battle.

Ongoing

-Attempt to bring math into students lives as soon as possible. I could do simple math such as counting with my fingers by one's and other numbers as well as learned simple mathematical concepts such as adding and multiplication by grouping.

-Make sure students are doing simple math workbooks on off times such as Christmas and spring break, and summertime to ensure past current and future material is up to date. Make sure your students are doing math on a daily basis regardless of whether or not given homework.

-Try to incorporate mathematics in daily life such as estimating driving times on road trips, costs of goods, and cell phone plans.

-Try to motivate your students given their passion to help them more easily learn math without direct implications of current material.

Extracurricular

Make sure your son or daughter has eaten breakfast, has a snack and lunch, and another snack if doing extracurricular activities after school such as tutoring or sports. Make sure your son or daughter has a water bottle for the day.

Note taking skills

-Show your son or daughter by example how to take organized lists like grocery or todo and folder systems such as bills. Use binder systems for things like recipe's to make sure the next generation doesn't forget the power of the analog pen.

Allow them to see the fault in the human brain thinking you will remember something in future based on such a vivid thinking you will remember it in future. Create a shopping list and see if they can remember the list without the list a drive later. This natural human behaviour of forgetfulness will allow them to much more easily understand the phenomenon forcing them to take much more efficient notes in the future.

My dad used to take notes while at played Nintendo. I'd say dad what are you doing, of course we will remember that. The location of some sword or secret potion. A little while later we forget look at the notes and on our way.

Test preparation

-The best way for students to study for a test is to take their binder and question from them. Then making up questions. Seriously. If you or your spouse aren't able possibly a sibling. I know this is a difficult task.

There is currently a lack of material in education today especially which for a direct link to curriculums. I guarantee student have a difficult time finding work similar to question their teachers are asking them.

-Student should be relieved of their binders and the ability to see their old solution while redoing questions or preparation is the best approach for another family member to ask questions from their book. Most specifically teachers notes questions.

-It's not enough just to do the assigned homework for test preparation as you must redo it and attempt to find other homework from other teachers or websites or bookstores.

Link

I do have to say so many of the topics are linked and you have most probably already noticed.

-All of the aforesaid all need to be in sync. A chain is only as strong… sigh. Your son or daughter must use their binder reminder tor ecords test dates. You must make sure you understand the binder system and make sure they are allowing for enough time to prepare, around their already busy calendars.

Extra marks

It is almost necessary to see the teacher after class in their office hours in university. It is a great skill start it early as possible.

-Having your son or daughter see their math teacher on a regular basis outside of school time drastically improves their grades. Just the act showing the extra effort gets way more half marks on homework and on tests and hints like remember what we did in office hours.

Teachers are also I believe normally vain towards their profession whereby in a situation like after class or office hours the teacher will actually say oh don't really worry about that type of question or here's an example of a question you will see on the test.

Balance

What students fail to realize is that at some point between the confusion of elementary school to high school they don’t understand that they go from a world of logical math to a world of teacher steps and yes while its good to keep that logical questionative mind it is also good to accpet the new situation where you must listen to the teacher and read the books and takes notes on the steps.

This is because humans can only do a couple of arithmetic calculations in their head at one time. So elementary school is a breeze but they have given up in the system of teachers and don’t listen or take notes in class failing to realize this lack of note taking and following steps is the reason they will remember and be able to do less presently but then snowballing in their level of ability to recall steps from the past and how they exponentially spread into doing math in the future and just like exercise and you get out of shape and it is so much harder for you to get back in shape in the future, Another lifelong lesson children are yet to realize which everyone will learn in the future.

This steps/logic balance is one they will take on into the work place allowing them to excel in a very group work force today.

A side note

Now getting tests back

There is a supreme lack of funding in the math department today. All department but will focus on this one right now.

Teachers don't give back tests because they believe student will give them to their class mates. Students are allowed to have it for a brief moment of the next day's class to review their mistakes. Nowhere near enough time. No wonder students have difficult time because they don't even get the best resource for what they need to work on**.**

**The problem is the schools math department don't have enough material to make different test each year.**

**Today students just take pictures and they go viral throughout the school unknowingly by the department. I say just give the tests back because it is a useless policy anyways. Yes it is expensive to make tests but so much more value in giving them back.**

Now here is the hard truth. And this is a tough one as I know communication and connection can be difficult.

Parents have to take accountability for their students until the end of high school. This isn't 100 years ago when students left school at 12 years old into trades. Students are much more emotional and stressed out with so much information and technology it seems as though parents need to play a larger role in monitoring to a degree their students behavior with respect to school and life.

Having your students study even when the test isn't coming up is worth so much more than studying the night before. Students who know this fact are so much more efficient than students who don't. It's the same analogy as staying fit as the difficulty of gaining weight and trying to lose it.

Another very important part of math is getting into groups and studying and doing homework

Not only does this prepare student tremendously for very problematic group projects later in their education and in worklife but also whether or not the student is working with another student above or below or equal to their grade level both students benefit tremendously

Students on the learning end gain by one of their peers explaining them mathematical methods which in so many cases the language used is much more relatable than the teachers

Students on the teaching end gain by forcing them to explain their understanding not only connecting left and right brain but also filling in so many gaps of what they do not understand.

Finding the right motivation or the right motivator can be difficult but I strongly recommend you find what interests your students most and how you can relate math to that subject of their interest.

I know this last point can be extremely difficult given the nature between students and parents these days as it's difficult to get past the distractions of technology.

If you are unable to motivate your child please find peers or role models for students to look up to and attempt to find the motivation in a student to learn math so they will more easily be able to find at least a little passion in that area of their work and life.

**Closing**

This will be the end of our meeting and I Thank you all for coming. I really appreciate you sharing your time with me and listening to all that I have to contribute with my most deepest passion of not only helping people but hopefully leading them to see the world a little different.

I am available questions presently and for private sessions to more thoroughly go through all of the topics discussed here tonight or you can see me again at a seminar or purchase my dvd or package **or check out our website for all sorts of free resources**.

I hope that some of my nerdiness has rubbed off and I thank you for sharing it with me.

I wouldn't be so passionate about these topics if following these procedures in math hadn't helped my work life and my business so much.

I would like to make a special thanks to Dragon naturally speaking audio dictation software and all the feedback I have gotten from parents and students throughout the years which has dramatically improved my ability to focus and simplify these topics

Thank you everyone