

Throughout my observations starting with the sixteen hour block, I started to think about everything in terms of math and how it is used. When really thinking about this concept everything we touch and see uses math either to assemble the product or for the product to even run. There are little tiny calculations being performed around us at alarming rates of speed. For the most part this is what is making our world run twenty four hours a day seven days a week. Much of what we see and feel throughout our day we as humans take advantage of math without thinking.

During my sixteen hour observation period my day started at 7:30 am. I didn't wake up to an alarm but when I woke up I grabbed my phone and started to browse Facebook and various news sites to catch up on news. Normally I wouldn't think about it, but every little bit of what I was doing on my phone involves math of some sort. Looking at the object calculus is involved in the programming of the phone and how the phone connects to the internet to allow to browse throughout the day. Moving on throughout the day on my drive to work in the morning there are minimal stops that are needed.

At 9:15 I get in my car and drive to work. On the way there I was first on the lookout for stop signs and other signs etc. Signs obviously use geometry that determines their size and shape. What interested me more though was my car. While driving to work I was paying attention to the things I was doing in my car. I have to accelerate, brake, and come to complete stops within certain distances adjusting braking power for my speed. In these instances there are many different maths involved there is trigonometry, calculus, and algebra involved. This is just so I don't get into an accident. We as humans don't actually make these calculations in our head, but rather, we guesstimate what we need to do in order to drive safely. Our cars though are calibrated using math. For instance our steering is carefully calculated so that when we move our steering wheel a certain distance our tires will move in a distance that is equal to the calibrated ratio.

From 9:30 to 10 I am working in my home office. Here I normally am catching up on work I neglected to do the day before. I didn't really observe much math in this area during my observation. During this time frame I stamped some envelopes using the postage meter and refilled the meters funds. The one thing that really stood out to me was the postage meter. Inside there is a spinning wheel that grabs the envelope and pulls it through the meter where a stamp is then applied to the mail piece. Like the car that spinning wheel is calibrated to spin at a certain speed to pull the envelopes through without any incident. While physics is used for rotational speed in order to complete physics we have to perform calculus and algebra to use physics formulas.

From 10:00 to 1pm I am working out of my Rapid City office. My work involves nothing but math throughout everyday. I work in mortgage work acting as a neutral third party to bother sellers and buyers of real property. To do my job without math is truly impossible by all accounts. I think about it so much that I forget that what I am doing is sometimes complex algebra. A unique encounter that I received during this observation period came with someone asking for a payoff on an account. Earlier in the week they asked for a payoff with their interest paid to a certain date. Well that buyer did not like the amount of interest he was charged. He then asked his seller to reduce the amount of interest that is needed to pay off the account. This is

where it became interesting. The seller just decided to divide the amount of interest by two. Well when working with interest we can't just divide numbers we have to reduce interest by a certain number of days. In this instance I had to use algebra to figure out to when then interest would have been paid to. I had to take the new interest amount due divided by the amount per day of interest on the account to figure out the amount of discounted days of interest. During my work hours these math instances are common and we have to figure these figures out daily for our customers.

The rest of my day during this sixteen hour block was really uneventful when looking at the world through math goggles. I noticed street lights that are maybe on timers, pressure plates or uses a camera and computer system that senses traffic and changes lights accordingly.

During the evening hours from 5pm to 9pm I was sitting in my home relaxing from the grueling day of observing math. Looking around my house and observing the world around me I didn't find any unique math encounters that I already didn't observe in the morning hours in my house. I mowed the lawn then sprayed insecticide on the lawn after that. When mixing my insecticide I had to figure out the amount of insecticide I needed for two gallons of water. This involved algebra because the instructions were written for fourteen gallons of water and not for the amount that I was using. Lucky two gallons is divisible by 14 so this was easy enough to figure out. I only needed one once per two gallons of water.

My observations period for the eight hours took place on a Saturday. Normally my weekends do not contain much activity. I preserve these days to hopefully do nothing and enjoy the fact that I don't have to do anything. This Saturday wasn't any different from my other Saturdays. I wake up my wife and the kids cook some breakfast then we get ready to go ice skating lessons. Like the sixteen hour observation period I woke up and checked my phone for the latest news. As before I thought about how the intricacies of the cell phone works from the mathematical perspective. These little devices are truly amazing on their own with everything they can do.

At 10:30 my wife and kids packed up into the car to go to skating lessons. This time while I was in the car I was not so much paying attention to how the car was driving, or the road signs. These were already observed earlier. This time I was paying attention to the road and how it was laid down. We live in the hills. As you can imagine the road system might be pretty complex. We live nearly 4000 ft above where Rapid City is so going to town there are a range of downhill slopes that are around 10% grade. I thought about this as I was driving down to town that in order for this road to exist here the construction workers had to use trigonometry to safely build the road.

At 11:30 we arrived at the skating rink. We had to have my daughters skates sharpened this week since it has been quite sometime since the last sharpening. This was my next mathematical acquaintance. When sharpening skates we have to consider what kind of edge will be needed. When I brought the skates to the counter the employee asked what kind of hollow do I want on the skate. Well this is important to know because this is the radius in the valley of the skate blade. For the employee to know what I am talking about he first needs to know geometry and how the radius relates to the ice skate.

At 12:30 after the ice skating lessons we went to target to shop for a little bit. This was the second encounter with math. We didn't have any limits of what to spend but when getting to the checkout there is invariably math involved with the checkout process. Albeit for the cashiers all the math is done on their computers anymore and the cashier no longer has to think about the correct amount of change to give back or how to total the items is sales discounts or anything. With that said as a consumer I need to pay attention and use some quick algebra to ensure that the cashier did not make a mistake. This time the cashier did not make a mistake and she didn't need to give change back because I used my card to pay for my items.

From 5pm on I was again looking around my house to cases that need to use math either it was math I used or math that was needed during construction that I use everyday. This time I came up with the use of the electricity that I use in my house. This math is started when the electricity is stepped down at the transformer to 120v to enter my house through the electrical panel. From there the electricity is split up into separate circuits that are wired through my house. When thinking about it each of the circuits wiring are determined by the breaker and how many amps it can handle. Knowing this information If I use power tools and other heavy amperage appliances I have to know be able to calculate what I can run and not run before creating a dangerous situation on my house wiring. To demonstrate this I started my generator that is rated to 12k starting watts and hooked up to the house. While doing this I carefully started each appliance until my generator became overloaded. If I knew what each of my household appliances used I

would not of had to start each appliance one at a time. I would of just calculated the values and matched them against what my generator is rated at. Electricity is calculating using a variety of mathematics ranging from physics, thermal dynamics, calculus and I am sure many others.

While looking around I thought for sure that my weekend observation would of produced null results in the mathematics department from the standpoint of math I need to perform. I discovered that even though I was not actively engaged like I was when performing my job during the sixteen hour period there was still a lot to observe and perform throughout the day. I did have to go looking for it more than I did when I was working and my observations that I noticed were the same ones that I had during the sixteen hour period therefore I did not include time during this observation time.

Did you encounter any mathematical observations that could be applied to algebra, geometry, statistics, trigonometry, pre-calculus, calculus, discrete math? If so, list the math topics, and the observation you encountered.

During my observations I think I observed the use of algebra, geometry, trigonometry, calculus, and maybe discrete math. Other observations applied to physics and thermal dynamics.

6. During these two observations, in what way(s) have you used math without realizing that you were actually using it?

The main way that I used math without realizing it would be while I was driving. Our brains make so many calculations per second that if we actually sat and worked out the math it would take a really long time. Which made me think about an abstract idea that we as humans do much more math than we think we do. Our brains just process the information before there is time to really think about it. The hard part is proving how our brains arrived at our actions by using math.

7. Describe, in detail, at least three ways you can utilize this activity to manage your mathematical skills, and keep them sharp

Observing

By observing the math that surrounds us we become more aware of where it is at and when it is involved. The simple act of observing mathematics as we view the world is an act of furthering our education.

Questioning

We then have to take our math that we observed then question if it is correct. Many statistics that we hear in advertising and the news etc. might be made up or partial truth to the real statistic. For this reason we need to question and keep questioning the mathematical reason behind what we observe in our world.

Proving

The next step in using this exercise to keep improving our math skills is to prove the math that we have observed. This is the most critical step in the process without our proofs we cannot justify that we are right in our thinking. After we observe we then question the math that we saw. Proving is providing the answer to our questioning process. This step also creates the application of backing up our facts, and keeps us honest when relating the facts.