

MARINE ARTILLERY OFFICER BASIC COURSE

SMARTPACK

**FORT SILL, OKLAHOMA
August 2016**

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WELCOME ABOARD

Welcome to the Marine Corps Artillery Detachment, Fort Sill, OK. You have been chosen to represent the Artillery Community as a Marine Corps Officer. With that being said, review the Mission Statement of the MarDet, Fort Sill, and be prepared to be a part of the most knowledgeable and professional Marines you will have the pleasure of serving with:

The mission of the Marine Artillery Detachment, Ft Sill is to develop a training continuum for the Artillery Occupational Field (08XX) and 2887 Military Occupational Specialty (MOS), serve as the focus for artillery training issues. The detachment will validate training and education requirements, assist in drafting of Doctrine, Tactics, Techniques and Procedures (TTPs) and Programs of Instructions (POIs). The Detachment will also provide subject matter experts (SMEs) and instructors to provide training (both entry-level and sustainment) and mentorship to artillery Marines and the United States Army Field Artillery School (USAFAS). In addition, the Detachment will promote the advancement of artillery programs and instruction through direct coordination with the operating forces, Headquarters Marine Corps (HQMC), Marine Corps Warfighting Lab (MCWL), Training and Education Command (TECOM) and USAFAS.

During your time here as a student, immerse yourself in the doctrine, instruction, and rich history that is the Field Artillery School. You will be attending the Field Artillery Basic Officer Leader Course with our brothers and sisters in the United States Army. Take advantage of this time as it can prove invaluable to have connections in other services in today's joint fight. Additionally, you will be a part of the Marine Artillery Officer Basic Course (MAOBC). This is a completely remodeled course designed to prepare you specifically for the mission you will be required to accomplish when you enter the Fleet Marine Forces (FMF) or USMC-R.

This course is one of the most academically challenging courses you will attend your entire Marine Corps career. Realize this, and take it as a challenge. You are no longer a student of general knowledge as the past 15+ years of school has taught you. You are now expected to be the resident expert in your MOS as an 0802 and will be entrusted with America's sons and daughters once you leave this schoolhouse. Their lives will be in your hands, and the foundation you lay while you are here at Fort Sill is designed to prepare you for any challenge you meet in the future. Take advantage of your instructors as well as the rest of the staff at Fort Sill to help expand your knowledge base and connections across the Marine Corps. There is nowhere else in the world that has this much expertise in the Field Artillery community.

We look forward to seeing you upon arrival and feel free to call if you have any questions. Until then, this Smartpack is designed to help prepare you for your near future. It is a product of students after action reports that have gone before you, requesting that the information enclosed be sent out to you before arrival. To start, you will see that a few students took the time to write you a letter in hopes that you take lessons learned from them and apply them to ensure your success.

Semper Fi,
Branch Chief, MAOBC
Phone: (580) 442-6324

FT SILL QUICK REFERENCE MAP



Map Key

1 – Suddenlink office, on the back side of the post office, the only internet provider on Fort Sill for the Barracks. You will need to set up an appointment. It will take a couple of days for them to come out so it is recommended to call them in advance and set up an appointment for the day you arrive. Phone number (888) 592-3861

2 – Building 900. The Marine Barracks also known as “The Bricks.” This will be your residence if you choose, you can stay off base at your own expense. Address is Bldg 900 Donnelly Rd, Fort Sill, OK 73503

3 – Acceptable parking areas for class. Any spot that is next to a building or would generally be considered convenient is not for you.

4 – Brown Hall Bldg 759 McNair Rd, the S-1 shop for the MarDet, and where you will check-in. It is the star on the map, **the first place you want to go when arriving to Fort Sill**. Also located in this building is the CO and XO’s office as well as the MarDet conference room where you will have your ‘Welcome Aboard’ briefs.

5 – Snow Hall. The majority of classes will be in this building on the first floor. There is a Shopette on the basement floor.

6 – Supply. CIF issue.

7 – Summerall Hall. This is where the Gunnery and Fire Support offices are as well as “Webster Auditorium” where your first day of class will be, ‘Terms and Ammo.’ Additionally, you will be issued Text and Instruments (T & I) from here before classes start.

8 – The UPS Store. Most students will get a mailbox here. It is very affordable and you can double up on boxes. Also at the UPS Store you can buy what they call the “BOLC” package, which is a bunch of laminated sheets and supplies needed for the course. Highly encouraged.

9 – The Pershing Complex – located here is Pershing Hall. This is where you will have the majority of your classes outside Snow Hall.

10 – Building 912/913. The MarDet Battery barracks and staff offices. In Bldg 912 is where the building manager for Bldg 900 works, Mr. Tony, and is where you will get room keys from upon check-in.

11 – Monti Hall. Many of your Sims will be in this facility.

12 – Burselson Hall. This is where the majority of your automated classes will be for Gunnery. You can park in the lot just south of the building.

*Directions to the barracks and Brown Hall are delineated by red arrows on the map coming from Fort Sill Blvd.

LETTER 1

Future MAOBC students,

Congratulations on being selected to become an 0802. I am writing this letter to you in order to give you some insight and advice based on my experience on how to do well here at Fort Sill. Not every piece of advice will work for you but I graduated Fort Sill as the Distinguished Honor Graduate of my class so some of it should be helpful.

1. Be humble. Regardless of how you did at The Basic School, regardless of your major or how you did in college, some part of this course will challenge you and require you to ask for help. Do not be afraid to ask your instructors or other students for help. That is how the course is designed. You will be fire-hosed with instruction especially during the first 2 Blocks of instruction. The intent is to take the best notes and references you can, process that information, and then work in groups through the homework until you **actually understand and conceptualize** what you are doing. If you don't, make sure you go see your instructor and get help. That is why they are there. If you can't explain the process of what you did to get an answer to someone, then you do not fully understand it. The exams will challenge your full understanding of concepts.
2. Set goals and be able to prioritize activities. If you want to do well at this course, there are certain times, especially in the beginning, where you must prioritize what you want to accomplish in a day. Class will typically go from 0830-1730 with an hour lunch break. During the first 2 Blocks of instruction, be prepared to do around 2/3 hours of homework 4 nights a week, and some more on Saturdays and Sundays. So that means during the week, you really need to prioritize what activity outside of work you want to do to decompress your mind. For most people that was going to the gym. For others it was reading, or going fishing. But most days for example, between class and homework, you will have time to get to the gym, eat something, and then do homework until it is time to fall asleep. But in the time after class and before homework, it is crucial to get your mind out of the books and do something else.
3. Enjoy your time in Oklahoma. To start I will mention that during the first month or so at Fort Sill I would not plan any crazy out of town trips. There will be homework to do over the weekends. But as you settle into the course and get a grasp of the work load, make sure you get out and about in the area and explore. There are watering holes, places to camp, swim, and hike. Oklahoma City is about an hour north, Dallas is 3 hours south, Norman (Oklahoma University's Campus) is an hour north, and other cities like Austin, Sweetwater, Houston, etc. are all around. There is also a very nice golf course on base which is a very good time.
4. Stay organized. Many of your tests will be open note and reference. The goal of the course is not for you to memorize everything, but know how to efficiently reference notes and publications to get correct answers. Organize homework, class examples, practice problems, and notes. Use page tabs to mark publications and step action drills. The tests are usually given in 4 hour blocks of time. If you work efficiently, it will not take you that full time to finish the exam. Do not waste the remaining time. Take a break and then go back through every answer and problem until time runs out. You will catch countless careless mistakes of material you know. I only got one 100 on a Block exam because I would miss one or two questions due to something careless.

Very Respectfully,
2ndLt, USMC

LETTER 2

Dear Incoming Marine,

First off, congratulations on being selected as a Field Artillery Officer. With that being said, it is time to make the transition into getting from Quantico, VA to Ft Sill, OK. Upon beginning to make your trip to Ft Sill, I would recommend getting there as soon as you possibly can to get everything organized before the classes start. On top of that, I would recommend calling Suddenlink and setting up a time and date for them to come set up internet (you won't have your room # yet, but just update them on that when you are assigned to a room in the barracks). Having internet early on will help significantly, personally my class didn't have internet until the second week which definitely made things more difficult. Additionally, make sure you start to work on pull-ups and your run times, because if you fail to get above a 275 you will have to PT with the Army Lt's every morning (it's not the end of the world, those Marines that didn't achieve a 275 still did fine). Those that get above a 275 are given the freedom to PT on their own at whatever time they choose. I used that privilege to get extra sleep and would just work out in the afternoons to decompress from all of the classwork from that day.

Moving on, FA BOLC is broken up into 4 Blocks, which will consist of both Fire Support and Gunnery. I can't emphasize this enough, be prepared to do around 3/4 hours of homework and studying during Block 1&2 practically every night. Some will understand the material better than others, thus I would recommend trying to work in groups that way if you have questions or issues those can be easily resolved. Not to mention, instead of not completing an assignment because you tried to do it alone, working together will enable you to fix mistakes with your peers when you have conflicting answers.

Additionally, the kitchen/common area is not for homework, get a group together and knock the homework out together in the basement. It's quiet and has chalk boards that can be used to work through the more difficult problems. My best advice is to really try to achieve understanding of the Block 1 material, because simply getting good grades on the homework won't provide success on the exam if you haven't taken the time to discern the material yourself. My homework grade was in the top 3 of my platoon when the Block 1 exam came around, but I had not completely grasped certain concepts and instead of doing some extra reading on my own I took my homework success as the test would not be too difficult. I failed and in doing so, and my chances of being an honor grad were shot. Block 2 is going to require an excruciating amount of time in order to achieve understanding, but just realize that after Block 1&2 things will slow down. The manual side of Gunnery is no joke, so stay dedicated and work hard through the first couple months and you will find success. Believe it or not though, you can dig yourself out of a hole. Having failed the Block 1 exam, I knew I needed to change my approach. I continued to work in groups but focused more on trying to understand concepts and also making sure my notes were organized for the follow on tests. It worked well as I climbed back up the ranks falling short of the honor grad list by 3 spots. Keep grinding, no matter what the situation is.

You are probably wondering why I haven't mentioned much about Fire Support yet, and that's simply because the emphasis early on is really dominated by Manual Gunnery. Fire Support will not take nearly as much time as Gunnery will except for the JCATS briefs. Those are essentially like a 5 paragraph order just briefed and broken up differently. It's honestly nothing to worry about. After Block 1&2, you will start to learn AFATDS which isn't all that difficult after you get the reps in. Additionally, I would recommend slowly but surely focusing on the Safety exam which is a pass or fail exam. Best way to prepare for this exam is to get the reps in, practice a bunch of safeties (one a night, 2-3 weeks out) and come time for the exam you will have seen everything that could possibly be on the exam plus you will have examples of them. This will provide you with more than enough preparation and ultimately you will have no problems passing. Overall, you are about to begin a very academically based school and need to treat it as such. Put the time forth from the get go and try to get ahead of the curve. Don't forget to enjoy yourself from time to time though. Some spots I would recommend include the Wildlife Refuge which is relatively close, good for the nature lovers. Then there is Norman and OKC, we would go to those areas from time to time just to enjoy ourselves. Norman is home to the University of Oklahoma, they have decent restaurants and bars if you are into that, plus with the school year rolling around you may be able to catch a sporting event or two. OKC offers much of the same. My class was fortunate enough to catch some of the NCAA Basketball tournament games there.

Good luck Marine,
2ndLt, USMC

LETTER 3

Post MAOBC letter to new 0801's,

1. It is very unlikely for you to have gone through a course like this before. You need to treat it as such. I say this because the way it is taught, especially for those who are not math savvy or detail oriented. Blocks 1 and 2 especially are fire hose instruction and it is not a 'memorize and regurgitate' style exam. I recommend the following...
2. Take notes, even if you don't understand them. Later on once you're able to decompress and actually allow the material to sink in, you'll be able to go back and reference them as the instructor intends.
3. Don't waste the remaining time on an exam. If you finish early, take a couple minute break and go back over the entire exam. 9 times out of 10 you will find a mistake you made. Especially with anything related to safety.
4. It wouldn't be wise to travel your first few weekends. You really need to focus on the homework and practical exercises. They are gold and ensure you note your corrections in a different color pen. One thing that really helped me is when I would grade or make my own corrections. I would make notes of exactly what led to the incorrect answer to better understand conceptually what I was doing. There are a lot of small condition based rules that can play with your mind especially a couple hours into any gunnery session. If you take anything from this letter the above note is what allowed me to build a reference of checks that I could conduct my own secondary checks with before I turned my exam in.
5. In preparation for the safety exam, I was able to stay organized by using dividers for each charge. Within that, I had all past safety T's with my red pen correction and notes as to what lead to those mistakes. In addition to that I had all the formulas and a TFT reference sheet. Find whatever helps you to stay organized.

Respectfully Submitted,
2ndLt, USMC

Tips for MAOBC Students

- Work in study groups
- The basement of the barracks is for homework, not the common room. Respect the common room as a place to relax, not do work.
- Keep the barracks clean. Officers and enlisted use the common areas. Clean up after yourself and if you see a mess, clean it.
- Suddenlink is the base internet provider, get started on setting up an appointment for installment prior to arriving on base. Phone number (888) 592-3861. Location is provided on map.
- Get a CAC card reader and make sure it works on your computer.
- Do not expect to check-in on a weekend or outside of business hours.
- Set up a mailbox at The UPS Store on base, location is provided on map.
- Make sure you get your vehicle weighed prior to leaving TBS and keep all receipts.
- There are no kitchens in your rooms. There is a common room kitchen in the barracks. Keep it clean.
- Helpful Addresses
 - Brown Hall: Bldg 759 McNair Rd, Fort Sill OK 73503
 - The Barracks: Bldg 900 Donnelly Rd, Fort Sill OK 73503
 - The UPS Store: 1712 Macomb Rd, Fort Sill OK 73503
 - Suddenlink is located in the same building at the Post Office, delineated on map
- Have a personal laptop and printer
- The Army Hotel (Holiday Inn) has free breakfast every morning
- Be able to score a 275 or above on the PFT upon arriving at school or you will be on remedial PT every morning
- If living out in town with family one place that is known to be nice is called The Flats, 3502 E Gore Blvd
 - Recommended to live in the barracks especially to get work done, it is also free of charge.
- Good barbers around town:
 - Suzy's
 - OK Barber
 - East Side Cutz

GUNNERY READ AHEAD

Section 1: Artillery Expression

Section 2: Introduction to Interpolation

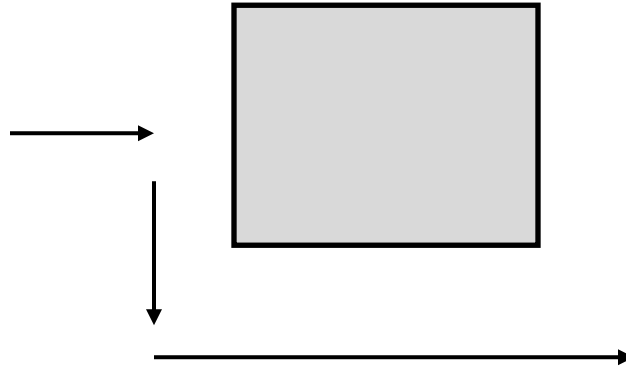
Section 3: Weapon System and Ammunition Familiarity

Answers to Practice Problems

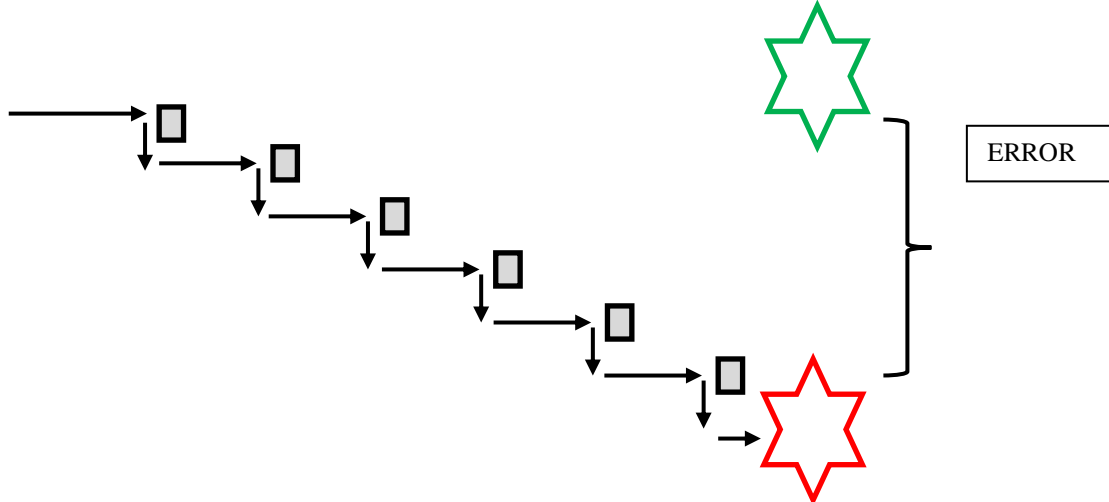
Section 1: Artillery Expression

You are probably familiar with the term “rounding” in mathematics. In general, the rule is quite simple; if a number must be rounded, simply take the number to the closest value and accuracy for which you wish to round it. The only special rule in rounding is that if you are exactly halfway between two values (at 0.5 for example), then you always round up.

The problem with always rounding up is that it introduces an upward bias. In professions like banking and artillery, we want to avoid this bias as it can skew results. A visual example is best to explain this principle. Imagine you are attempting to navigate to a point far away with a compass. Now suppose you run into a small building which you must go around and you choose to go around it to the right (Figure 1-1).



This deviation moves you slightly off course, but probably won't affect you reaching your end state. But what if you keep running into obstacles? If your rule is to always take a few steps to the right around every obstacle, in the long run you will be way off track (Figure 1-2).



Always rounding numbers at the halfway point to the higher value produces this same type of error. In order to avoid this error, artillerymen do not “round,” we “express.” The rule is no different than rounding for values that are not exactly halfway; however, if I am exactly halfway between two values, then we express to the even value, instead of always rounding higher. For example, 3.5 expresses to 4 because 4 is an even value. Rounding 3.5 would give you the same result. But consider 2.5; expressing 2.5 to the nearest whole value provides a final answer of 2, because 2 is the even value.

This expression also works for negative numbers. If I were to express -13.55 to the tenths place, my choices would be -13.5 or -13.6. Because 6 is the even value -13.6 is my expressed value. One strange case is expressing 0.5 to a whole number. Your options are 0 or 1. Zero is actually an even number, so 0.5 would express to 0. Again, this special rule only applies when numbers are exactly halfway; 1.2 still expresses to 1, 155.7 still expresses to 156 and so on. Here are a few examples for you to consider:

Example 1: Expressing to the Tens Place

How would you express 145 to the tens place? Your options are 140 and 150. You must decide which is even. At first glance they both appear to be even, but you are trying to decide the tens place value, so your choice is between 4 and 5. 4 is the even number, not 5, so 145 expresses to 140.

Example 2: Expressing to the Whole Number

How does 15.51 express to a whole number? You may be tempted to apply special expression rules about even numbers, but don't! Expressing to even values only applies when you are exactly halfway between two values. In this case we are trying to decide whether to express to 15 or 16. Because 15.51 is clearly closer to 16, it expresses to 16.

Example 3: Expressing to the Thousandths Place

The thousandths place is three numbers to the right of the decimal place: 0.00X. How would you express -5.1275 to the thousandths place? Our options for the thousandths place are 7 or 8; because 8 is the even number we would express it to -5.128.

Try the following problems:

1. Express the following values to the tens place:
 - a. 1024
 - b. 5.5
 - c. 4025
 - d. 75
 - e. -14.99
2. Express the following values to the tenths place:
 - a. -947.55
 - b. 4.7
 - c. 102.05
 - d. 1.66
 - e. 6.949
3. Express the following values to the whole number:
 - a. 0.5
 - b. -0.5
 - c. 6.500

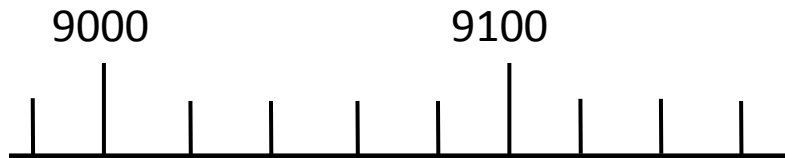
Section 2: Introduction to Interpolation

Interpolation is a mathematical method of estimation that is often used to determine a non-listed value that is between two listed values. There are two kinds of interpolation you should be familiar with: visual interpolation and mathematical interpolation. Let's start with visual interpolation.

Visual Interpolation

Visual interpolation is nothing more than estimating, as accurately as the human eye allows, values between numbers. For example, suppose we have a specialized ruler that represents ranges in meters (Figure 2-1). Notice that our ruler is labelled every 100 meters and has graduation marks between these labels. If you count the marks you will realize that each graduation has a value of 20 meters, although they are not labelled. If this is not obvious, simply count the number of marks from the first labelled value to the second labelled value and divide the difference in value by the number of marks.

Example: $9100\text{m} - 9000\text{m} = 100\text{m}$ and $100\text{m}/5 \text{ marks} = 20\text{m}$
Figure 2-1



At first glance it appears this ruler can only measure accurately to 20m, but what if the value we want to determine is exactly between two graduation marks? In that case we might be able to guess the value between the marks fairly accurately to the nearest tens of meters. This is called visual interpolation and we can utilize this method to measure more accurately (Figure 2-2).

For example, in the figure below we can see the line we are attempting to measure falls between two graduation marks. We can read the labels (9000m and 9100m) and the graduation marks (every mark = 20m). Based on the red line's location, we can visually interpolate and determine in crosses at range 9050m.

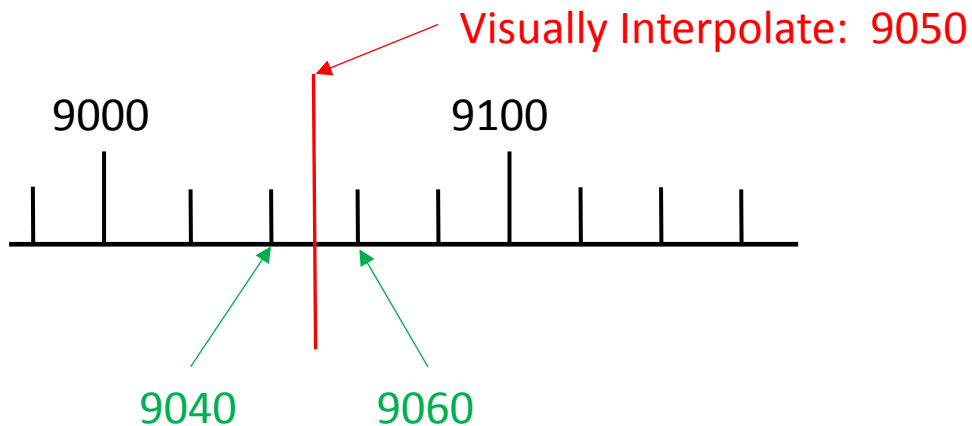
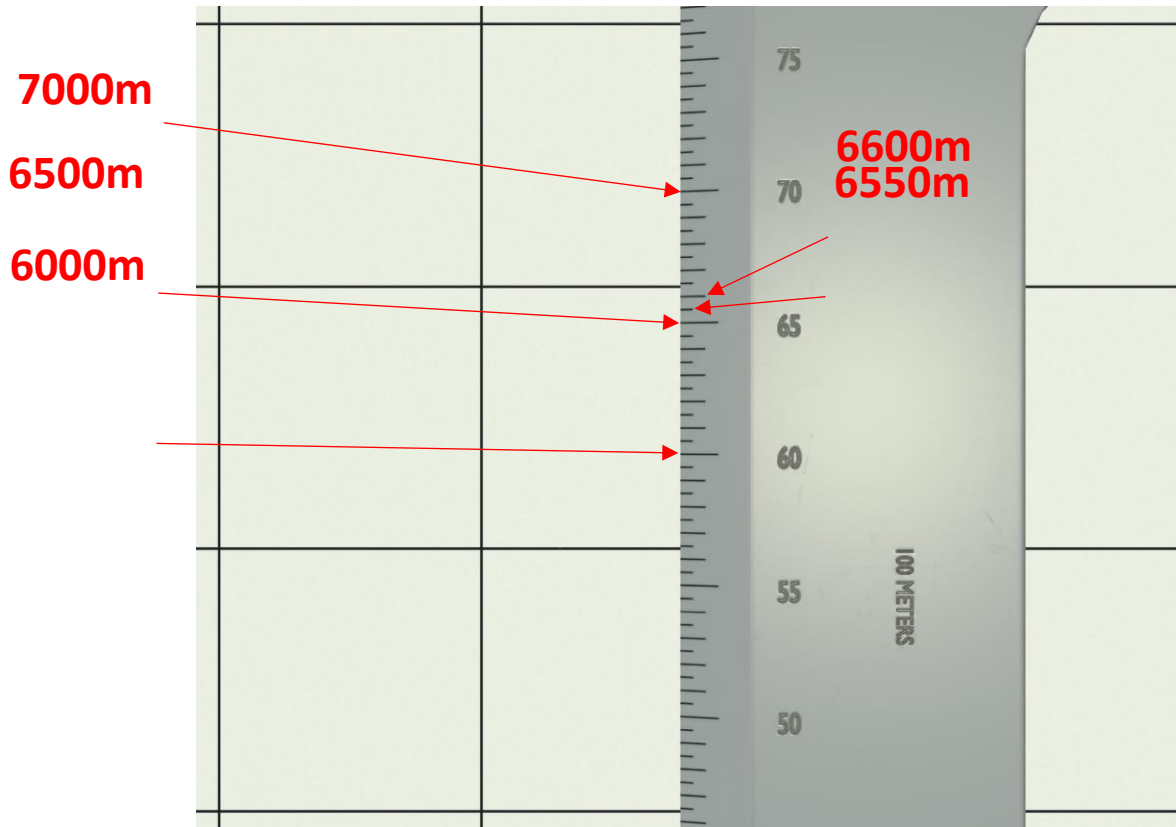


Figure 2-2

It is important to note that different rulers are designed to be visually interpolated to a certain accuracy. For example, on our ruler it is nearly impossible for us to measure to the nearest meter. Every ruler is designed with labels, graduation marks, and visual interpolation values. Let's try a few more example and problems.

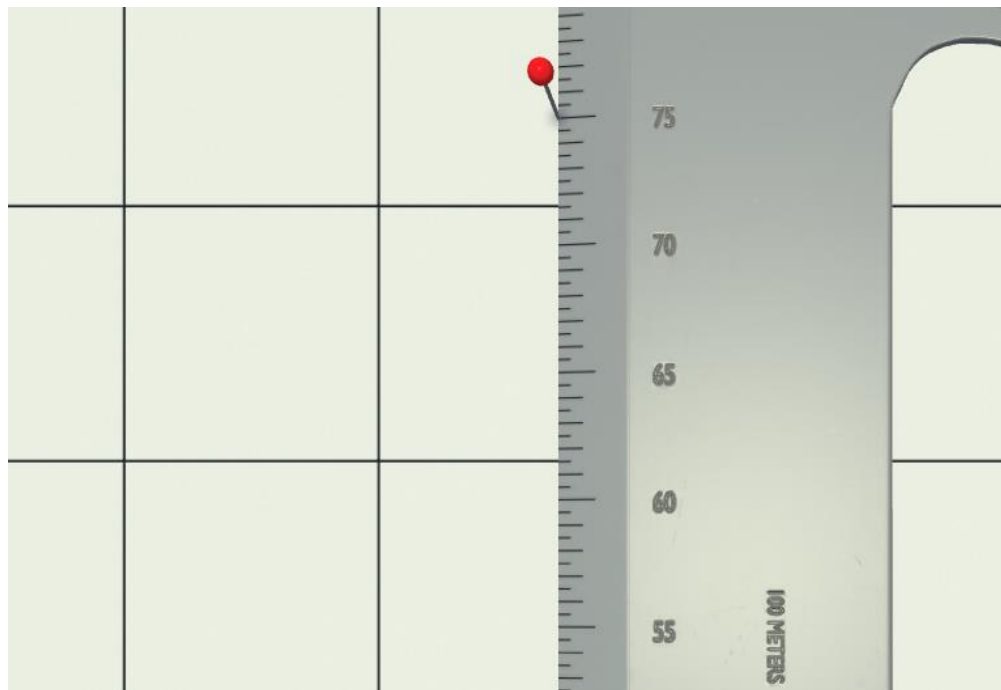
Example 1

Notice our new ruler, which measures meters, is labelled every 500m, graduated every 50m (large graduations at 100m, small graduations at 50m), and can be visually interpolated to the nearest 10m.

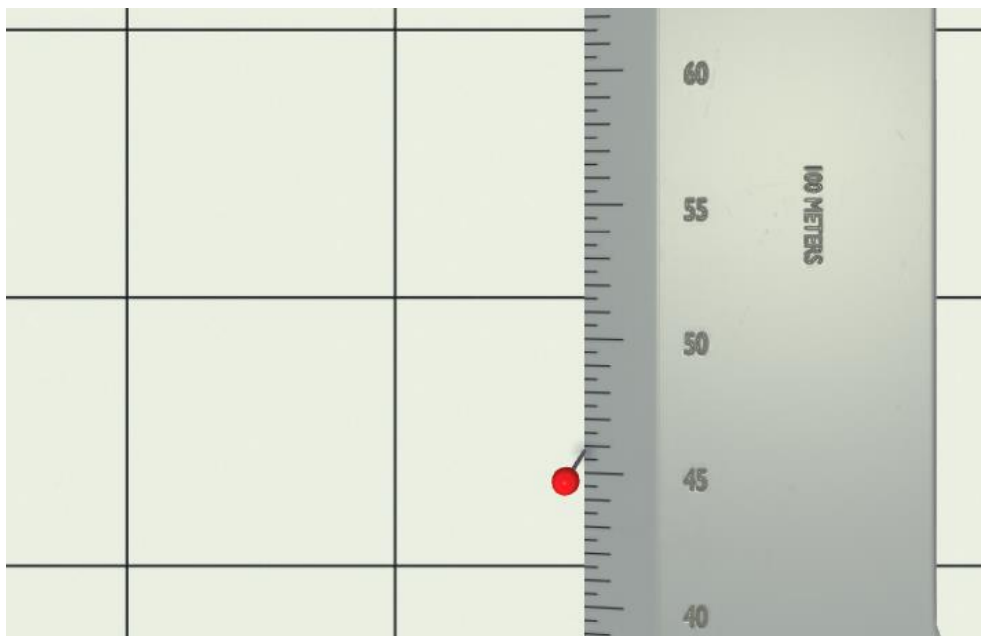


Try the following problems: SECTION 2A

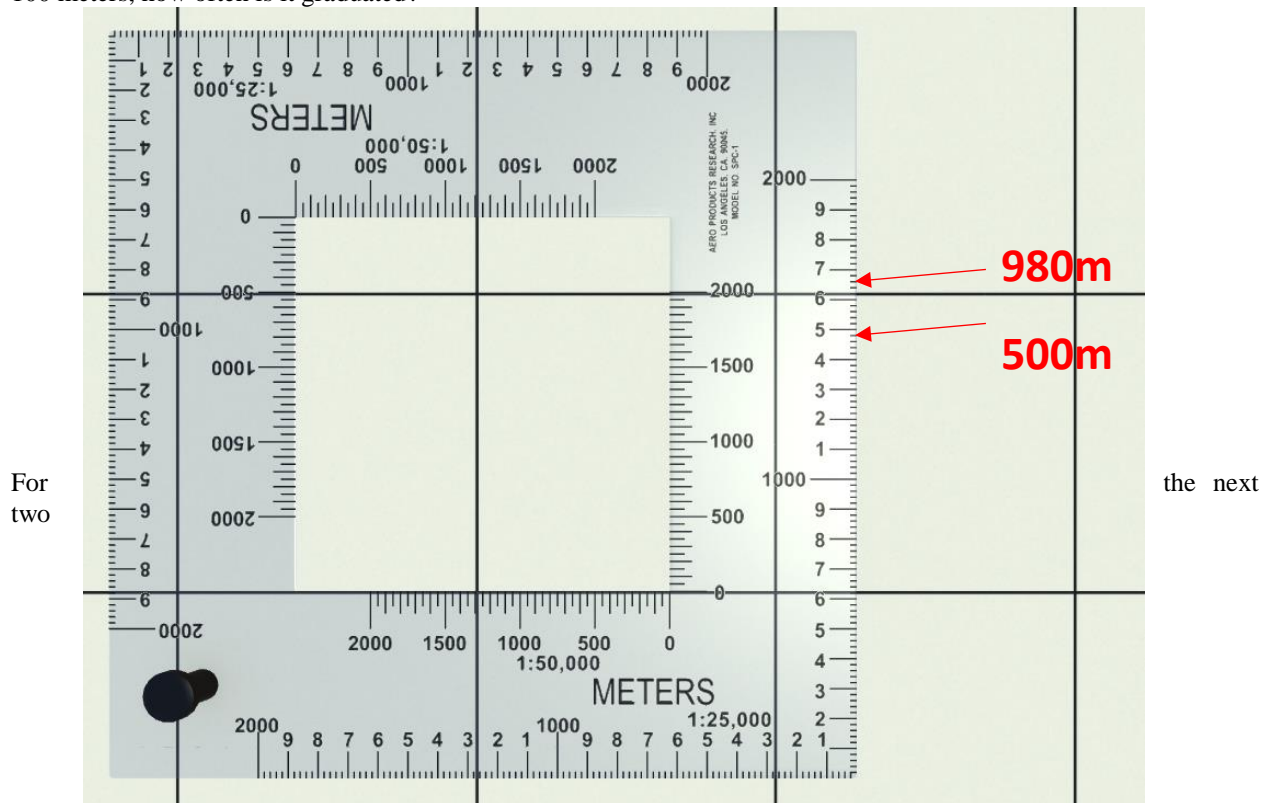
1. In the figure below there is a pin that is resting against our ruler. What is the reading along the meters scale?



2. What is the reading for the pin along the meters scale?



3. Notice the outer scale on the new ruler depicted below. If this ruler measures meters and is labelled every 100 meters, how often is it graduated?

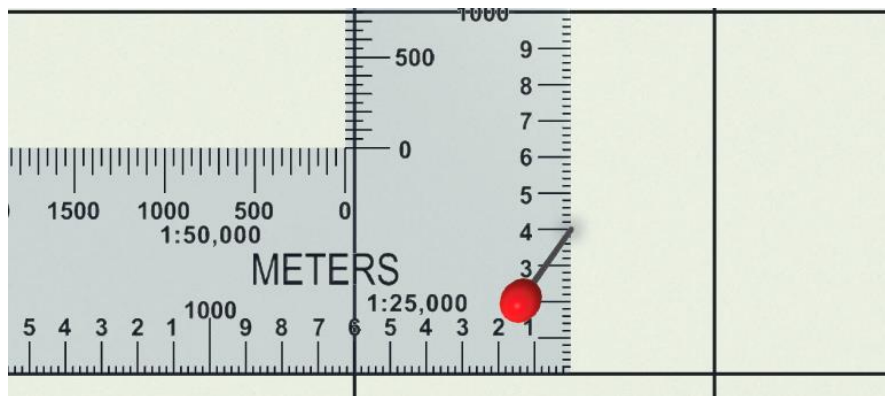


For two

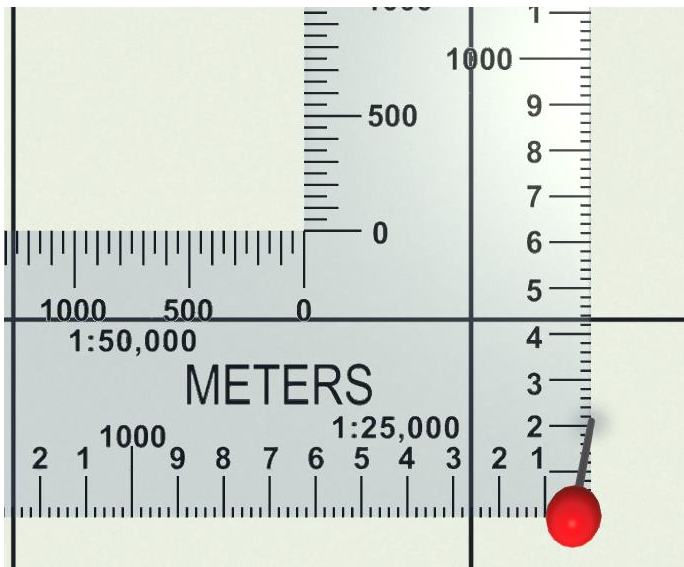
the next

problems, assume that you can interpolate to the nearest 10 meters on this scale:

4. What is the reading at the pin along the meters scale?



5. What is the reading along the meters scale?



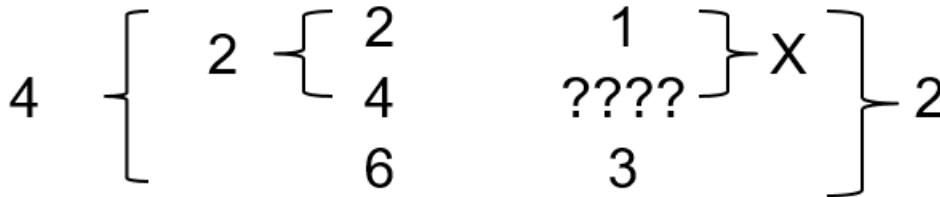
Generally speaking, visual interpolation is the easier of the two forms, but the general principle is the same for the mathematical determination. Let's use a simple example to describe the process of mathematical interpolation. Suppose you are throwing basketballs and someone is counting the shots you make and miss. The person counting your shots is rather inattentive and only records every few shots. Here is what is recorded:

# of Shots	Baskets Made
2	1
6	3
10	5

According to this chart if you shoot twice, you'll make one basket and if you shoot six, you'll make 3, and so on. The question is, if you shot four times how many baskets would you make? It's fairly obvious that the answer is two. You have just mathematically interpolated, you just didn't realize it. Most likely you realized that 4 is halfway between 2 and 6, and that 2 is exactly halfway between 1 and 3. The mathematical formulation for this is:

$$\frac{4 - 2}{6 - 2} = \frac{x}{3 - 1} \text{ where } x \text{ is the difference between the value we are looking for and 1.}$$

Here is a visual of how we set up our equation:



In order to solve for x, we need to set up a ratio of the differences (inside over outside). Your ratio should look like this:

$$\frac{2}{4} = \frac{x}{2}$$

Solving for x, we find that:

$$\frac{2}{4} * (2) = x, \quad \text{Therefore } x = 1$$

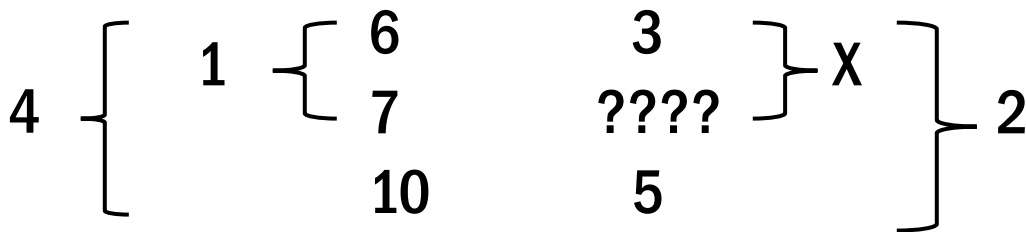
We don't quite yet have our final answer, however. The x is the difference between 1 and the number we are looking for, so we have to add the x to the 1 (baskets made). Since 1+1=2, the number of baskets made with 4 shots is 2.

This is generally the easiest method to mathematically interpolate. Simply follow five steps: 1) record the numbers in two columns that you are interested in, 2) determine the differences in values as depicted, 3) set the ratios equal to each other inside over outside, 4) solve for x, 5) add the value for x back to the original value on the top right side of your columns.

Note: You must artillery express (see Section 1: Artillery Expression) the value you determine for x to the appropriate accuracy of the extracted column before adding it back in. In order to understand this, let's use the basketball scenario again. This time, try to figure out how many baskets you would have made had you attempted 7 shots.

# of Shots	Baskets Made
2	1
6	3
10	5

Just by inspection we can see that the math will probably work out to a decimal answer, but it is impossible to make fractions of a shot! I either make it or I do not. The way we avoid nonsense answers like this is by expressing when I determine my value for the x. Let's see how this works:



So, what does our ration look like? Inside over outside:

$$\frac{1}{4} = \frac{x}{2}$$

And when we solve for x:

$$\frac{1}{4} * (2) = x, \quad \text{Therefore } x = 0.5$$

Here is where the problem lies. If I add 0.5 to 3 I will determine 3.5 shots made, but this is impossible. I am only allowed to make whole numbers of shots. Because the column on the right is accurate to the whole number, I must express my x value to a whole number before adding it back in. Another way of stating this is that I am not allowed to add a more accurate number than the table allows. In this case 0.5 expresses to 0 (exactly halfway, 0 is an even number), therefore my x=0, 3+0=3. My final answer, after interpolating, is I will have made 3 baskets with 7 attempted shots.

Try the following problems: SECTION 2B

1. If you attempt 9 baskets, how many will you make?
2. If you attempt 3 baskets, how many will you make?

# of Shots	Baskets Made
2	1
6	3
10	5

3. A golfer has only practiced his even numbered irons while on the range. Provided below is the club he hits and the range he can achieve with that club. How far can he hit his 5 iron?
4. How far can he hit his 3 iron?

Club	Distance
4 Iron	217 Yards
6 Iron	194 Yards
8 Iron	170 Yards

5. A cannon is engaging targets at various ranges in meters. The first column lists these ranges, the second column lists the Times of Flight associated with firing projectiles at that range. If you fire a projectile at 1650m, what will the time of flight be?

Range	Time of Flight
1600m	5.3
1700m	5.6
1800m	6.0

6. What is the Time of Flight from question 5 expressed to the whole second?

Section 3: Weapon System and Ammunition Familiarity

During your period of instruction (POI) you will be introduced to many different kinds of weapon systems and ammunition. It is highly recommended that you memorize as many nomenclatures and facts about each howitzer, propellant, projectile, and fuze as possible; you will be introduced to many more later on, so familiarity with the various nomenclatures will significantly improve your experience during the first few weeks of class. You are going to be flooded with information and the better prepared you are now, the easier it will be.

- I. Howitzers
 - a. 105mm Howitzers

M119A3



CARRIAGE: TOWED
BORE: 105MM
MAX RANGE: 19.5 KM
CREW: 7

- b. 155mm Howitzers

M109A6 PALADIN



CARRIAGE: SELF
PROPELLED
BORE: 155MM
MAX RANGE: 30KM
CREW: 4

M777A2



CARRIAGE: TOWED
BORE: 155MM
MAX RANGE: 30KM
CREW: 10

II. Ammunition

a. Propellants

i. MACS Charges

M231 PROPELLANT



GENERAL DATA

SYSTEMS: 155mm HOWITZERS
NOMEN: M231
COMMON NAME: LIMA CHARGE
GRAIN: MULTI PERFORATED
ZONES: 2 (CHG 1-2)
RANGE: 3-11 KM



ZONES: 3 (CHG 3-5)
RANGE: 7-22 KM
M232 IS A BI-DIRECTIONAL LOADED CHARGE.
M232 REDUCES LOGISTICAL FOOTPRINT AND
THERE ARE NO INCREMENTS TO BURN AFTER FIRING.

b. Projectiles

i. M107 High Explosive (HE)

RESTRICTIONS

ZONE 5 (5H) M232A1 IS RESTRICTED FROM
FIRING IN THE M777A2. BASE MODEL M232 IS
NOT.

M107 HE PROJECTILE



GENERAL DATA

SYSTEM: 155mm HOWITZERS
NOMEN: M107
COMMON NAME: HE
PROJECTILE FAMILY: M107

iii. M110 White Phosphorous (WP)

M110A1/A2 WP PROJECTILE



GENERAL DATA

SYSTEM: 155mm HOWITZERS
NOMEN: M110A1/A2
COMMON NAME: WP
PROJ FAM: M107

c. Fuzes

iv. Point Detonating (PD)

POINT DETONATING (Q, PD)



NOMEN: M557
FUZE SETTER: M18
TIME: DELAY 0.05 SECONDS
BURSTING CHARGE/TUBE PROJ ONLY.



NOMEN: M739A1
FUZE SETTER: M18
TIME: DELAY 0.05 SECONDS
BURSTING CHARGE/TUBE PROJ ONLY.

v. Mechanical Time Super Quick (MTSQ)

MECHANICAL TIME SUPER QUICK (MTSQ)



NOMEN: M577
FUZE SETTER: M35 OR FLAT
SCREWDRIVER
TIME: 2 TO 200 SEC
RESTRICTIONS: BASE EJECTING
PROJECTILES ONLY.



NOMEN: M582
FUZE SETTER: M35 OR FLAT
SCREWDRIVER
TIME: 2 TO 200 SEC
BURSTING CHARGE/TUBE
PROJECTILES ONLY.

iii. Electronic Time (ET)

ELECTRONIC TIME FUZES (ET)



NOMEN: M767
FUZE SETTER: EPIAFS OR BY HAND
TIME: 0.5 TO 199.9 SEC
RESTRICTIONS: BURSTING CHARGE
PROJECTILES ONLY.



NOMEN: M762A1
FUZE SETTER: EPIAFS OR BY HAND
TIME: 0.5 TO 199.9 SEC
RESTRICTIONS: BASE EJECTING
PROJECTILES ONLY.

vi. Variable Time (VT)

PROXIMITY FUZES (VT)



NOMEN: M728
FUZE SETTER: M27 OR BY HAND
TIME: 5 TO 100 SEC
RESTRICTIONS: BURSTING CHARGE
PROJECTILES



NOMEN: M732A2
FUZE SETTER: M27 OR BY HAND
TIME: 4 TO 156 SEC
5 TO 150 SEC (M732)
RESTRICTIONS: BURSTING CHARGE
PROJECTILES

Answers to Practice Problems

Section 1: Artillery Expression

1. Expressing to the tens place
 - a. 1020
 - b. 10
 - c. 4020
 - d. 80
 - e. -10
2. Expressing to the tenths place
 - a. -947.6
 - b. 4.7
 - c. 102.0
 - d. 1.7
 - e. 6.9
3. Expressing to the whole number
 - a. 0
 - b. 0
 - c. 6

Section 2a: Visual Interpolation

1. 7500 Meters
2. 4580 Meters (+/-10 Meters)
3. 20 Meters
4. 400 Meters
5. 201 Meters

Section 2b: Mathematical Interpolation

1. 5
2. 1
3. 205 Yards
4. Not Enough Information
5. 5.5 Seconds
6. 6 Seconds

