SAT Intensive Workshop - Day 1

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Don't forget to bring your calculators every time! Also, don't forget to bring a laptop tomorrow, Tuesday (and every Tuesday) if you want to type your essay. Otherwise, handwritten is also fine. As we discussed, if we finish all of our work on Friday, we can spend the last hour or so playing board games or doing whatever you think is "fun".

1 Policies

1.1 Class Conduct

Like I said, I plan to keep it fairly casual in the classroom. You are not in middle school anymore, and college is not far off. As such, I plan to give you more privileges than you might get at school. For example, just tell me you're going to the restroom – it's not like I'm going to say no anyway. However, these privileges are just that – privileges. They can be taken away if you abuse them.

I am more than happy to allow class-related discussion while I am presenting, as I believe that learning happens best within peer groups and with laughter. However, I do ask that we pay attention when a fellow student is talking or presenting – getting up to talk is no small feat, and we want to make sure that everyone feels supported in their academic endeavors.

1.2 Electronics

Cell phones should be used sparingly, if necessary, throughout the day. Checking notifications every once in a while for critical messages is fine with me, as long as it doesn't turn into an extended Snapchat story browsing session, etc. I do expect phones to be put away immediately if I ask you to do so. If you finish a practice exam, have double-checked your work, and feel confident about your answers, using your cell phone under the table is fine, but the screen must be out of view of the other students in the room. I do not anticipate this being a problem, but if I feel that a student is using their phone too much, I reserve the right to ask them to put it away.

Regarding laptops – some of you have expressed the desire to type some essays to save your hands. I agree. I probably won't be able to read some of your handwriting, so typed essays sound good to me too. However, we will do some handwritten essays to simulate the actual test-taking experience. This is a privilege, not a right – if I see anyone using their laptops for non-academic work, laptop privileges will be revoked for everyone in the classroom.

Of course, I reserve the right to change these rules should electronic use interfere with anyone's daily learning.

2 Today's Events

- Full PSAT exam.
- Lunch.
- Icebreakers.
- Review of mathematics sections 3 and 4 from the morning PSAT.
- Mathematics section 4 practice exam.
- Discussion of mathematics section 4 practice exam.

Note that these notes are not meant to be comprehensive, but rather a brief outline of the major points we covered today. In order to get the most out of class, you should be taking personal notes on the topics for which you need the most help.

2.1 Full PSAT Exam

Sorry that you had to start off our time together by sitting through an entire exam, but some unpleasant things have to be done in life. You all received your scores back, and I was generally pleased with everyone's performance. Everyone has some areas on which they need to work, and it is my hope that I'll be able to help you with these trouble topics.

2.2 Lunch

Lunch. Yum. Also Hay Day.

2.3 Icebreakers

We learned what a bullet train is, that no one has ever gone skydiving, that Lululemon bags are popular, and that Catherine has a nightstand, but not a desk, in her room. Go figure. Also, dance and cheer are different. Also Hay Day, and Shiyin is bad at Fortnite.

2.4 Review of mathematics sections 3 and 4 from the morning PSAT

We covered a lot in not much time, so here's a summary of the main points that we covered. In particular, I want you to remember the testing strategies that we covered in class, including using the answer choices, keeping an open mind and not blindly applying things, and so on. Remember that all of them boil down to this one sentence: FEWER CALCULATIONS MEANS FEWER STUPID MISTAKES. Some major things that we covered follow.

2.4.1 Percents

Recall that the symbol "%" means divide by 100. Therefore, to convert a fraction to a percent, what we are really doing is multiplying by $\frac{100}{100} = 1$, so that it doesn't change the actual value of the fraction. For example, to convert $\frac{16}{145}$ to a percent, we do the following:

$$\frac{16}{145} \cdot \frac{100}{100} = \frac{16}{145} \cdot 100\% = \frac{1600}{145}\% \approx 11\%.$$

Additionally, in convoluted percentage problems, it is often useful to set a number for a whole.

Example 1.1. In an Italian class, 65% of the students are men. If 52% of the women and 44% of the men get a certificate, what percentage of the entire class got a certificate?

Proof. Here, we set the number of people in the class to be 100. Then, there are 65 men and 35 women in the class. So, $52\% \cdot 35 \approx 18.2$ of the women get a certificate, and $44\% \cdot 65 \approx 28.6$ of the men get a certificate. Then, 47.8 of the 100 students get a certificate, so 47.8% of the students get a certificate.

Note that this method may introduce some weird things, such as "18.2" women. Ignore this discrepancy. □

2.4.2 Weird Slopes

Normally, two perpendicular lines have slopes that multiply to -1. There is one exception, though – when the lines are perpendicular to the x-axis and the y-axis, respectively. The one perpendicular to the x-axis has a slope of 0, since it doesn't rise at all, while the one perpendicular to the y-axis has a slope of undefined, since it doesn't run at all.

2.4.3 Statistics

Definition 1.2. Given a measurement, the *margin of error* refers to how close the statisticians feel the actual number lies to their measurement. For example, if a 30% measurement has a 3% margin of error, statisticians feel "certain" (in industry, this is 95% sure) that the actual value lies somewhere between 27% and 33%. It is usually written as $30\% \pm 3\%$.
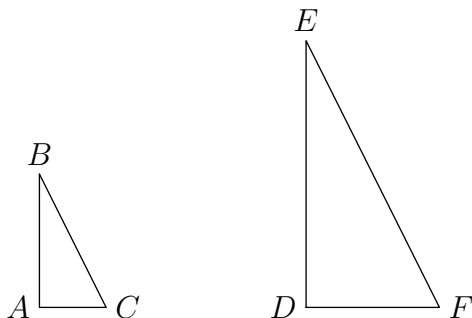
Definition 1.3. In the above example, the *range* of the measurement is $(27\%, 33\%)$. In general, for a measurement $x \pm y$, the range is $(x - y, x + y)$.

2.5 Review of mathematics section 4 practice exam

2.5.1 Similar triangles

Definition 1.4. Two triangles are said to be *similar* if they all have the same angles.

Theorem 1.5. If the two triangles

$\triangle ABC$ and $\triangle DEF$ are similar, then:
$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}.$$

When working with similar triangles, it is often helpful to draw the triangles in the same orientation, so as to avoid confusion with writing the correct ratios in the correct order.

3 Homework

Homework will usually go here, but since you all are probably tired from the diagnostic exam, we'll forgo the vocabulary test today.