## SAT Prep Class TJHS Spring 2018



This Study Packet Belongs to:

Homeroom:

Chromebook \#:

TJ SAT MATH PREP WEBSITE: http://www.sosanko.weebly.com and look for the SAT tab lat the top of the page.

## Length of the SAT

The SAT is 3 hours long. The optional Essay is an additional 50 minutes. The actual length of time you will spend at the testing center will be longer because of breaks and the time it takes to fill out all of the demographic information prior to the actual test. REMEMBER TO BRING ID TO THE TESTING CENTER (even if you take the test at TJ).

## Section Breakdown:

- Reading Test: 65 minutes, 52 questions
- Writing and Language Test: 35 minutes, 44 questions
- Math Test - Two Sections:

1) No calculator: 25 minutes, 20 questions
2) Calculator: 55 minutes, 38 questions

- Optional Essay: 50 minutes


## Scoring:

The SAT is scored on a 400 to 1600 scale. The average score is 1000 . The essay score is optional in the redesigned SAT and will not be factored into your score. The essay scores will be shown separately on your score report.

## No penalty for guessing:

There is no penalty for wrong answers, so don't leave anything blank!

## Practicing:

The best way to practice is to link your College Board account and a Khan Academy account. You were given a hand-out in class with directions on how to do this. You can also visit the website https://www.khanacademy.org/sat and click "Start Practicing." The site will prompt you to create a Khan Academy account.

You will want to join Khan Academy as a "learner" and enter your birthdate.

Khan Academy will now ask you a series of questions.
First, have you already taken the PSAT or SAT? For many of you, this answer will be yes because we took the PSAT in school.

If you have, Khan Academy will prompt you to sign into your College Board account (that you created when you registered for the SAT) so that you can send the results to Khan Academy. When you do so, the Khan Academy program will design a personalized study program for you based on your performance on the PSAT.

If you haven't taken the PSAT or SAT yet, that's ok. You can take a diagnostic quiz or practice test so that Khan Academy has enough information on your abilities to create a personalized program for you.

Once you are in your new Khan Academy account, you will see the main page called the Dashboard. You will probably want to practice at some point. That option is at the top of


If you haven't imported your PSAT or previous SAT scores, the system will prompt you to take a Diagnostic Quiz (total of 4).

Read the directions before you start the quiz. Some of them ask you not to use a calculator.
Once you complete the diagnostic quizzes, Khan Academy will create practice recommendations tailored to your abilities.

If you scroll down on this page, you will also see a full list of practice problems and videos to help you with them. You can work through these at your own pace. We will also try some of these in class.

## Full Length Tests:

The Khan Academy program also offers 8 different full-length practice tests that you can take at any time.

This can be done online, or you can download the test and print it if you prefer a paper copy.

If you take the paper-based version, you can use your phone and the SAT Practice app to scan your answer sheet and get immediate scores.

Remember, follow the directions in the math sections with respect to their calculator rules.

## Math Concepts Tested:

There are 4 domains that are tested on the math section of the SAT.

1) The Heart of Algebra (19 questions, $33 \%$ of the test)
2) Problem Solving and Data Analysis (17 questions, 29\% of the test)
3) Passport to Advanced Math ( 16 questions, $28 \%$ of the test)
4) Additional Topics in Math ( 6 questions, $10 \%$ of the test)

We will go through the exact learning objectives in each of the 4 domains listed above throughout our class. That's what the SAT will test you on.

## SAT Class Meetings: TUESDAYS

Week \#1: March 20
Week \#2: March 27
Week \#3: April 3
Week \#4: April 10
Week \#5: April 17
Week \#6: April 24
Week \#7: May 1
Classes run from $6-8 \mathrm{pm}$ with one hour dedicated to math and the other to reading/writing.

Math classes are held in room 222.

## Math SAT Prep Class Study Plan:

THIS PLAN IS SUBJECT TO CHANGE!!!
We will go over example problems in class and occasionally work through Khan Academy practice problems on the provided iPads or Chromebooks. You'll need headphones when we do this. Please just bring headphones to class every week in case we have time to use them.

The only required homework is listed under week \#1. I want you to sign-up for Khan Academy and link your College Board account. If you don't have a College Board account, take the 4 diagnostic quizzes instead. Please do all of this before Week \#2's class.

To get the most out of this class, you should try and keep up with the Khan Academy selfstudy listed under homework for each week. This is optional but strongly encouraged.

| Date | In class | Homework <br> (due at the beginning of the next week's class) |
| :---: | :---: | :---: |
| March 20 | Handout introductory packets. <br> Discuss College Board and Khan Academy. <br> Overview of the test. <br> Begin study of The Heart of Algebra: Linear Equations, Linear Inequalities, and Linear Functions. <br> Begin Examples \#1-\#14 We will complete whatever we can in class. You should read through the rest of the examples after class and complete what you can. You can ask questions about these next week. | REQUIRED: Sign up for Khan Academy and either link your College Board account or take all 4 diagnostic quizzes so that your personalized learning pathway can be created. <br> Bring headphones for next week! <br> Download the SAT Practice app on your phone or tablet (optional). <br> If you want to practice what we did in class on linear equations, inequalities and functions, go to your Khan Academy account and click on practice. Go through solving linear equations and linear inequalities, interpreting linear functions, and linear equation word problems. |


| March 27 | Continue the study of The <br> Heart of Algebra: Linear <br> Equations, Linear <br> Inequalities, and Linear <br> Functions. <br> Finish Examples \#1-\#14 <br> from last week. | To keep on track with self- <br> study, complete any of the <br> Khan Academy problems <br> you did not complete in <br> class. |
| :---: | :--- | :--- |
|  | Work through online <br> practice problems on Khan <br> Academy at your own pace: <br> linear inequality word <br> problems, graphing linear <br> equations, linear function <br> word problems, systems of <br> linear inequalities word <br> problems, solving systems <br> of linear equations, and <br> systems of linear equations <br> word problems. |  |
| April 3 | Begin study of Problem <br> Solving and Data Analysis. | Khan Academy Practice <br> under Problem Solving and <br> Data Analysis: Ratios, rates, <br> and proportions, percents, <br> and units. |
| April 10 | Ratios, Proportions, Units <br> and Percentage, Examples <br> \#1 \#5. | Continue study of Problem <br> Solving and Data Analysis. |
| Interpreting Relationships <br> Presented in Scatterplots, <br> Graphs, Tables and <br> Equations, and More Data <br> and Statistics | Complete examples not <br> done in class and read <br> through explanations. |  |
| Ehan Academy Practice |  |  |
| under Problem Solving and |  |  |
| Data Analysis: table data, |  |  |
| scatterplots, key features of |  |  |
| graphs, linear and |  |  |
| exponential growth, data |  |  |
| inferences, center, spread, |  |  |
| and shape of distributions, |  |  |
| and data collection and |  |  |
| conclusions. |  |  |,


| April 17 | Begin study of Passport to Advanced Math. <br> Adding, subtracting, multiplying polynomials and building quadratic functions. <br> Examples \#1-\#7 | Read over examples and explanations not completed in class. <br> Khan Academy Practice under Passport to Advanced <br> Math: solving quadratic equations, operations with rational expressions, operations with polynomials and structure in expressions. |
| :---: | :---: | :---: |
| April 24 | Continue study of Passport to Advanced Math. <br> Exponential Functions, Equations, and Expressions and Radicals, Dividing Polynomials by a Linear Expression, Solving Rational Equations, Relationships Between Algebraic and Graphical Representations of Functions, and Analyzing More Complex Equations in Context. <br> Examples \#8-\#19 | Khan Academy Practice under Passport to Advanced Mathematics: Interpreting Nonlinear Expressions, Quadratic and Exponential Word Problems, Manipulating Quadratic and Exponential Expressions, Radicals and Rational Equations, Polynomial Factors and Graphs, Nonlinear Equation Graphs, Linear and Quadratic Systems, Isolating Quantities and Function Notation. |
| May 1 | Additional Topics in Math: Geometry, Coordinate Geometry, Trigonometry and Radians, and Complex Numbers. <br> Examples \#1-\#12 | Khan Academy Practice under Additional Topics in Math: Volume Word Problems, Right Triangle Word Problems, Congruence and Similarity, Right Triangle <br> Trigonometry, Angles, Arc Length, and Trig Functions, Circle Theorems, Circle Equations, and Complex Numbers. |

Online Khan Academy Practice: Remember, you have to link your College Board account to you Khan Academy account if you have already taken the PSAT and/or the SAT.

If not, then you should complete the 4 diagnostic quizzes before you can start practicing the concepts below. This will give you a more PERSONALIZED study plan eliminating questions on topics you already know and stressing those you don't.

Also, if you are having trouble with a section, there is at least 1 (often 2 ) video that will help you. They are listed as "how-to examples" and separated by "basic example" and "harder example" to the right of each topic.

| Topic | Date Covered in Class (this is when you will <br> be prepared to work through the practice <br> online) |  |  |
| :--- | :--- | :---: | :---: |
| Heart of Algebra |  |  |  |
| Solving Linear Equations and Linear <br> Inequalities |  |  |  |
| Interpreting Linear Functions |  |  |  |
| Linear Equation Word Problems |  |  |  |
| Linear Inequality Word Problems |  |  |  |
| Graphing Linear Equations |  |  |  |
| Linear Function Word Problems |  |  |  |
| Systems of Linear Inequalities Word <br> Problems |  |  |  |
| Solving Systems of Linear Equations |  |  |  |
| Systems of Linear Equations Word <br> Problems |  |  |  |
| Passport to Advanced Mathematics |  |  |  |
| Solving Quadratic Equations |  |  |  |
| Interpreting Nonlinear Expressions |  |  |  |
| Quadratic and Exponential Word Problems |  |  |  |
| Manipulating Quadratic and Exponential <br> Expressions |  |  |  |
| Radicals and Rational Exponents |  |  |  |
| Radical and Rational Equations |  |  |  |
| Operations with Rational Expressions |  |  |  |
| Operations with Polynomials |  |  |  |
| Polynomial Factors and Graphs |  |  |  |
| Nonlinear Equation Graphs |  |  |  |
| Linear and Quadratic Systems |  |  |  |
| Structure in Expressions |  |  |  |
| Isolating Quantities |  |  |  |
| Function Notation |  |  |  |
| Ratios, Rates and Proportions |  |  |  |
| Problem Solving and Data Analysis |  |  |  |


| Percents |  |  |
| :--- | :--- | :---: |
| Units |  |  |
| Table Data |  |  |
| Scatterplots |  |  |
| Key Features of Graphs |  |  |
| Linear and Exponential Growth |  |  |
| Data Inferences |  |  |
| Center, spread, and shape of distributions |  |  |
| Data collection and conclusions |  |  |
| Additional Topics in Math |  |  |
| Volume word problems |  |  |
| Right triangle word problems |  |  |
| Congruence and similarity |  |  |
| Right triangle trigonometry |  |  |
| Angles, arc length, and trig functions |  |  |
| Circle theorems |  |  |
| Complex Numbers |  |  |

## Full-Length Tests:

There are 8 full-length practice tests that you can take at your convenience.


You can complete these online, or you can download and print them and complete them on paper. If you choose to complete them on paper, download the SAT Practice app on your phone. Once you complete the practice test, you can use your phone to scan your answer sheet and you will get a score from the app.

## Tips and Tricks:

- Some experts say you shouldn't spend more than one minute or so on any question. If it is taking you longer than that, put a big circle around the question in your test book and move on. You can go back later. I suggest marking your answer sheet, too so that you don't mis-grid an answer.
- Problems in the math section are arranged by level of difficulty. They get harder as you go.
- Remember, all problems, regardless of difficulty are worth the same number of points.
- Don't leave anything blank. There is no penalty for wrong answers. It is to your benefit to guess if you don't know.
- Bring a calculator you are familiar with. Don't go buy a brand new calculator the night before the test that you don't know how to use. If it requires batteries, bring extra!
- The college board website has a list of approved calculators. Check to make sure your calculator is on that list before the test. It can be found at this link: https://collegereadiness.collegeboard.org/sat/taking-the-test/calculator-policy


## These are the Texas Instruments Acceptable Calculators

Texas Instruments

- TI-73
- TI-80
- TI-81
- TI-82
- TI-83/TI-83 Plus
- Tl-83 Plus Silver
- TI-84 Plus/TI-84 Plus T
- TI-84 Plus CE/TI-84 Plus CE-T
- TI-84 Plus Silver
- TI-84 Plus C Silver
- TI-85
- TI-86
- TI-89
- TI-89 Titanium
- TI-Nspire/TI-Nspire CX
- TI-Nspire CAS/TI-Nspire CX CAS
- TI-Nspire CM-C/TI-Nspire CM-C CAS
- TI-Nspire CX-C CAS


# Domain \#1: The Heart of Algebra 

## Weekly Example Problems

Example \#1: In 2014, County X had 783 miles of paved roads. Starting in 2015, the country has been building 8 miles of new paved roads each year. At this rate, how many miles of paved road will Country X have in 2030? (Assume that no paved roads go out of service).

Note that this question has no choices. It is a student-produced response question. On the SAT, you would grid your answer in the spaces provided on the answer sheet.

Example \#2: In 2014, County X had 783 miles of paved roads. Starting in 2015, the country has been building 8 miles of new paved roads each year. At this rate, if $n$ is the number of years of 2014, which of the following functions fgives the number of miles of paved road there will be in Country X? (Assume that no paved roads go out of service.)
A) $f(n)=8+783 n$
B) $f(n)=2014+783 n$
C) $f(n)=783+8 n$
D) $f(n)=2014+8 n$

Example \#3: In 2014, County X had 783 miles of paved roads. Starting in 2015, the country has been building 8 miles of new paved roads each year. At this rate, in which year will Country $X$ first have at least 1,000 miles of paved roads? (Assume that no paved roads go out of service.)

Example \#4: To edit a manuscript, Miguel charges $\$ 50$ for the first 2 hours and $\$ 20$ per hour after the first 2 hours. Which of the following expresses the amount, C, in dollars, Miguel charges if it takes him $x$ hours to edit a manuscript, where $x>2$ ?
A) $C=20 x$
B) $C=20 x+10$
C) $C=20 x+50$
D) $C=20 x+90$

Example \#5: A builder uses the function $g$ defined by $g(x)=80 x+10,000$ to estimate the cost $g(x)$ in dollars to build a one-story home of planned floor area of $x$ square feet. If the builder estimates that the cost to build a certain one-story home is $\$ 106,000$, what is the planned floor area, in square feet, of the home?

Example \#6: Maizah bought a pair of pants and a briefcase at a department store. The sum of the process of the pants and the briefcase before sales tax was $\$ 130$. There was no sales tax on the pants and a $9 \%$ sales tax on the briefcase. The total Maizah paid, including sales tax, was \#136.75. What was the price, in dollars, of the pants?

Example \#7: Each morning, John jogs 6 miles per hour and rides a bike at 12 miles per hour. His goal is to jog and ride his bike a total of at least 9 miles in no more than 1 hour. If John jogs $j$ miles and rides his bike $b$ miles, which of the following systems of inequalities represents John's goal?
A) $\frac{j}{6}+\frac{b}{12} \leq 1$ $j+b \geq 9$
B) $\frac{j}{6}+\frac{b}{12} \geq 1$
$j+b \leq 9$
C) $6 j+12 b \geq 9$
$j+b \leq 1$
D) $6 j+12 b \leq 1$
$j+b \geq 9$

Example \#8: What is the solution to the equation: $\quad 3\left(\frac{1}{2}-y\right)=\frac{3}{5}+15 y$

Example \#9: What is the solution to the equation: $\quad-2(3 x-2.4)=-3(3 x-2.4)$

Example \#10: What is the solution ( $\mathrm{x}, \mathrm{y}$ ) to the system of equations:

$$
\begin{gathered}
-2 x=4 y+6 \\
2(2 y+3)=3 x-5
\end{gathered}
$$

Example \#11: How many solutions ( $\mathrm{x}, \mathrm{y}$ ) are there to the system of equations:

$$
\begin{gathered}
2 y+6 x=3 \\
y+3 x=2
\end{gathered}
$$

A) Zero
B) One
C) Two
D) More than two

Example \#12: In the system of equations below, $a$ and $b$ are constants. If the system has infinitely many solutions, what is the value of $a$ ?

$$
\begin{gathered}
3 s-2 t=a \\
-15 s+b t=-7
\end{gathered}
$$

Example \#13:


The graph of line $k$ is shown in the $x y$-plane above. Which of the following is an equation of a line that is perpendicular to line $k$ ?
A) $y=-2 x+1$
B) $y=-\frac{1}{2} x+2$
C) $y=\frac{1}{2} x+3$
D) $y=2 x+4$

Example \#14: A voter registration drive was held in Town Y. The number of votes, $V$, registered $T$ days after the drive began can be estimated by the equation $V=3450+65 T$. What is the best interpretation of the number 65 in this equation?
A) The number of registered voters at the beginning of the registration drive
B) The number of registered votes at the end of the registration drive
C) The total number of voters registered during the drive
D) The number of voters registered each day during the drive

