THE

ULTIMATE

SAT

NOTES

The SitSat Academy

What is the SAT?

The 'Scholastic Aptitude Test,' in short, is an exam high-school students write to get an admission in most universities, primarily the United States. This examination has reformed over the past years and we, The SitSat Academy, offer you the latest and most effective tips, strategies as well as important stuff you must know before taking the test.

What does the SAT test?

The SAT tests a student's ability in three major areas: Evidence-Based Reading, Writing, and Mathematics.

Evidenced-Based Reading requires you to analyze 5 passages given and select the best options for about 10 questions for each. There are 52 questions in total and 65 minutes to solve this section. The scaled score goes up to a 400. This section is often considered the most difficult but don't worry, these quick notes and our academy will work for you super fine!

The Writing section checks your grammar and editing skills. You will be tasked to edit 4 passages, each having 11 questions (44 multiple-choice questions in all) in about 35 minutes. Although you'll be given less than a minute to solve each question, this section is usually the easiest to finish. However, this section can get a little tricky, and provided you have a good foundation of the English language, sentence structures and other forms of basic grammar, you can walk through this section!

The passages generally revolve around the areas of Careers, Social Studies, the Humanities, and Science. All of the 4 passages provided will require no prior knowledge, similar to the Reading section, and will be non-fiction, explanatory and argument-based.

The scaled score goes up to 400, which sums up to a total of 800 for the 'Evidence-Based Reading and Writing' section.

Math section deals with the following concepts:

Content Area	Number of Questions	Description
Heart of Algebra	19 questions	Analyzing and fluently solving equations and systems of equations; creating expressions, equations, and inequalities to represent relationships between quantities and to solve problems; rearranging and interpreting formulas
Problem Solving and Data Analysis	17 questions	Creating and analyzing relationships using ratios, proportions, percentages, and units; describing relationships shown graphically; summarizing qualitative and quantitative data
Passport to Advanced Math	16 questions	Rewriting expressions using their structure; creating, analyzing, and fluently solving quadratic and higher-order equations; purposefully manipulating polynomials to solve problems
Additional Topics in Math	6 questions	Making area and volume calculations in context; investigating lines, angles, triangles, and circles using theorems; and working with trigonometric functions

Considering the fact that most students who take the SAT are in the middle or latter stages of their junior year, they may not be aware of some concepts of math that is tested in this section. Taking this into account, The SitSat Academy has included few important formulae and tips to tackle such problems.

The math section is further divided into two categories, each having a scaled score of 400:

No Calculator: You are prohibited to use a calculator in this section as the name suggests, and none of the questions require long, complicated solutions.

There are a total of 20 questions, which are to be solved in 25 minutes. This section gives an ample amount of time and students are advised to recheck their answers at least twice if granted enough time.

Calculator: Although you are allowed to use a calculator in this section, these questions too require less amount calculations and we advice our students to avoid the use of calculators for most part of the section – the ones involving basic arithmetic - since that would eat up your time and there's no guarantee that you tapped the right buttons in haste. This section consists of 38 questions, which are to be solved in 55 minutes. Pacing yourself in this section by prioritizing time for the more difficult sums will prove highly effective.

GRID-INS

These are the sort of questions that aren't given with multiple answer choices. There are a total of 13 grid-ins, of which 5 are in the No-Calculator sections and 8 are in the Calculator section. You will be asked to bubble the answer you think is correct. If a question has more than one possible answer, you are expected to fill in only one. Always remember: You can never have a negative number as an answer. If a fraction doesn't fit into the four boxes, simplify it or convert it to decimal and DO NOT round off your answers unless asked to. That is, 2/3 will give 0.666 and NOT 0.667

Refer to the below illustration to better understand Grid-ins.

HOW TO CRACK THE ENGLISH SECTION?

1) *Read the Blurb*: The small box at the top of every Reading passage gives an insight about what the passage is going to be on and you would be better prepared to face the questions that follow. It will only take less than 10 seconds of your time but could save you couple points!

2) *Always underline what the question asks*: There are several cases where students select the wrong option due to miscomprehending what the question truly asked. It is a common practice to rush through the test but that could really drag down your score. Don't be afraid to underline key words present in the question; the proctor will be absolutely fine with it,

3) *Glimpse through the questions before reading the passage*: This is self explanatory. Similar to the blurb tip, glancing through the questions would help you pick out answers while reading the passage and it would save a good amount of time in the end.

4) *If you get stuck between two completely similar options, they're often both wrong*: When you feel like there's an eerie pattern in the answer choices and that two choices mean absolutely the same thing, it's almost always safe to eliminate the two of them.

5) *Follow the Golden Rule of Reading – if it's not there in the passage, it's not the answer*: Although this strategy seems quite obvious on the surface, it is possibly the most valuable advice out there for the Reading section. Students are easily attracted to tempting options that include information not present in the passage. Although those options seem 'so right,' they aren't and identifying this common trick of SAT will allow you to master this test.

6) *Get acquainted with the rules of non-essential clauses and basic sentence structures*: These are often the topics that students break their heads on and building a firm framework in these aspects would definitely boost your writing score. [Barron's, Princeton Review and Erica Meltzer's Writing Book covers these topics effectively.]

Working on Khan Academy's (partnered with CollegeBoard) official practice tests and doing personalized tests on non-essential clauses and concepts in math you're not confident of will help immensely.

HOW TO CRACK THE MATH SECTION?

1) *Circle what they're asking for. Answer only that*: Similar to the English section, students often fall for silly traps in math questions. They may have asked for the value of 'x+3' but you ended up selecting 'x'. Read the question twice. Select your answer. Read the same question again and only then should you move on.

2) *The math section tests your cautiousness more than your quantitative ability*: Beware of traps in both, the questions and the options. The questions in the math section can get quite wordy so follow it with patience.

3) *Go quickly through the easy ones*: The math section always has a set of questions that barely take 5 seconds of mental calculation. Do not waste time here thinking that you may make a silly mistake. Play with the probabilities and pace yourself accordingly. Here, 'quick' doesn't mean 'fast.' It means to finish the questions in lesser time but not for the sake of doing so.

4) *Do not be lazy to re-check till the proctor says 'Stop'*: We understand that you will be mentally and physically exhausted while on the last minutes of your math section but remember, its going to get over anyway, so why not use a bit more of your energy? The secret to a perfect score is rechecking answers as much as possible because there's an extremely high possibility of a mistake or a question omission. Give it your best shot!

# SOME USEFUL MATH NOTES (PASSPORT TO ADVANCED MATHEMATICS):

PARABOLA EQUATIONS

Vertex form:

A quadratic function in vertex form will look like $y = a(x - h)^2 + k.$

The vertex of the parabola is (h,k).

The vertical line $x = h$ is the axis of symmetry.

Consider the equation $y = (x - 3)^2 + 4$. The vertex of the parabola will be the point with coordinates (3, 4) and the axis of symmetry will be the line $x = 3$.

(3, 4)

x = 3
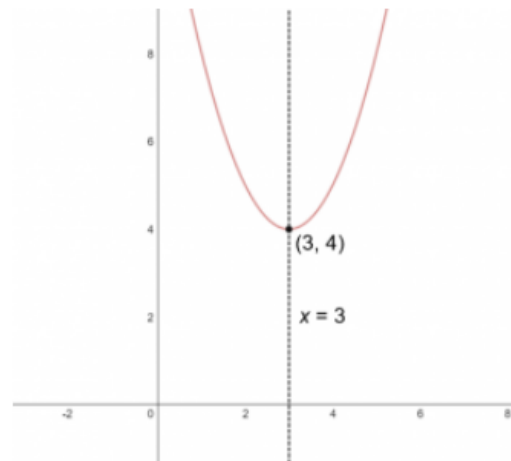
The vertex of the parabola must lie in the axis of symmetry, **so once you have the equation of the axis of symmetry, you also have the x-coordinate of the vertex. To get the y-coordinate, just run that x-value through the equation.**

Standard form :

Quadratic function in standard form looks like $y = ax^2 + bx + c.$

To find the axis of symmetry, use : $$x = \frac{-b}{2a}$$

Determine the equation of the axis of symmetry and the coordinates of the vertex for the parabola that results when the function $y = 2x^2 – 8x + 11$ is graphed in the *xy*-plane.

A. $x = -8$; (-8, 203)
B. $x = -4$; (-4, 75)
C. $x = 2$; (2, 3)
D. $x = 4$; (4, 11)

First, we need to find the axis of symmetry using the equation we saw above.

$$x = \frac{-b}{2a} = \frac{8}{2(2)} = \frac{8}{4} = 2$$

So the axis of symmetry is the line $x = 2$. We also know that the *x*-coordinate of the vertex is 2 as well. To find the *y*-coordinate, simply run 2 through the equation.

$$y = 2(2)^2 – 8(2) + 11 = 3$$

So the vertex is (2, 3) and the correct answer is Choice C.

The value of *a* determines which way the parabola opens. If *a* is positive, the parabola opens upwards and if *a* is negative, the parabola opens downwards.

Problems: http://blog.cardinalec.com/wp-content/uploads/2016/05/Additional-Practice-Quadratics-Parabolas.pdf

Solutions: http://blog.cardinalec.com/wp-content/uploads/2016/05/Solutions-Quadratics-Parabolas.pdf

IMPORTANT SITE - https://blog.prepscholar.com/functions-on-sat-math-linear-quadratic-algebra (Everything related to SAT functions)

A function can have many x-intercepts but only one y-intercept.

Vertical line test to determine whether the graph is a function.

You can always test whether a graph is a function graph using this understanding of inputs to outputs. If you use the "vertical line test," you can see when a graph is a function or not, as a function graph will NOT hit more than one point on any vertical line.
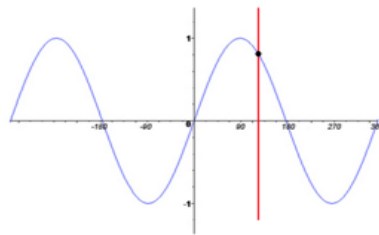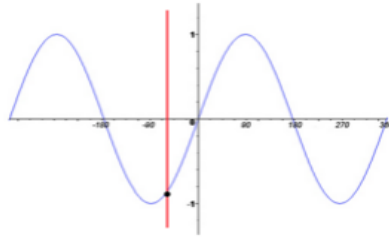
An **ordered pair** is the coupling of a particular input with its output for any given function. So for the example function f(x)=x2+5, with an input of 3, we can have an ordered pair of:
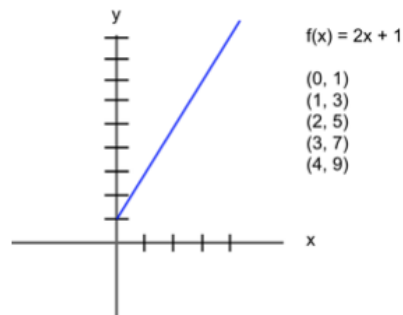
f(x)=x2+5

f(3)=32+5

f(3)=9+5

f(3)=14

So our ordered pair is **(3,14).**

Ordered pairs also act as co-ordinates and hence, can be used to graph a function too.

TYPES OF FUNCTIONS

Linear Functions

A linear function makes a graph of a straight line. This means that, **if you have a variable on the output side of the function, it cannot be raised to a power higher than 1.**


$f(x) = 2x + 1$

(0, 1)
(1, 3)
(2, 5)
(3, 7)
(4, 9)

Why is this true? Because x^2 can give you a single output for two different inputs of x. *Both* -3^2 *and* 3^2 equal 9, which means the graph cannot be a straight line.

Quadratic Functions

A quadratic function makes a graph of a parabola, which means it is a graph that curves to open either up or down. It also means that **our output variable will always be squared**.

The reason our variable must be squared (not cubed, not taken to the power of 1, etc.) is for the same reason that a linear function *cannot* be squared—because two input values can be squared to produce the same output.

For example, remember that 3^2 and $(-3)^2$ both equal 9. Thus we have two input values—a positive and a negative—that give us the same output value. This gives us our curve.
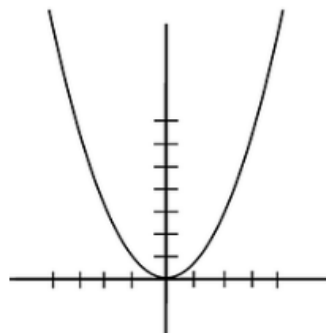
(Note: a parabola *cannot* open side to side because it would have to cross the *y*-axis more than once. This, as we've already established, would mean it was not a function.)

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SOME IMPORTANT POINTS:

1) A graph of a quadratic will be a "U" shape (either "open up" or "open   down").

If the "a" variable is positive, then the graph opens "up"; if the "a" is negative, then the graph opens "down"; if the "a" is 0, then you have a line.

2) The graph of a quadratic will intersect the X axis at **0, 1 or 2 points.**

3) The y-intercept of this line (the "c" variable) is important because it anchors the graph at a point and then the graph either opens "up" or "down"

The *a* **value** tells us how the parabola is shaped and the direction in which it opens.
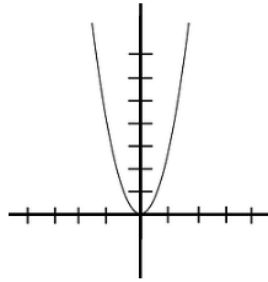
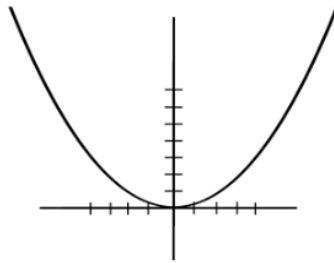A **positive** *a* gives us a parabola that opens upwards.
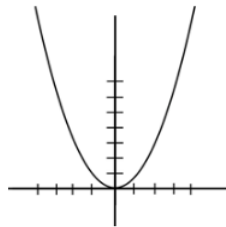
A **negative** *a* gives us a parabola that opens downwards.
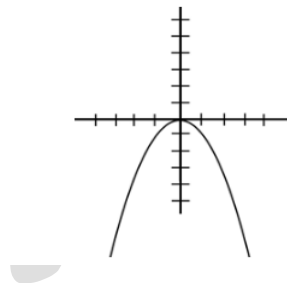
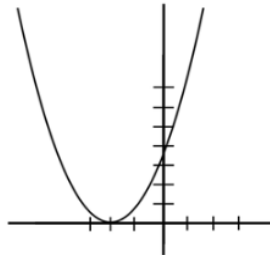A **large** *a* value gives us a skinny parabola.

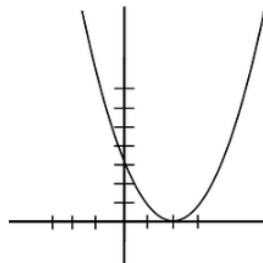A **small** *a* value gives us a wide parabola.

B value :-

The *b* **value** tells us where the vertex of the parabola is, left or right of the origin.

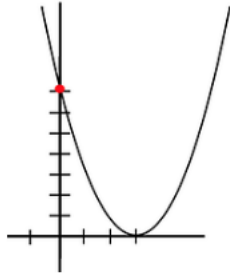A **positive** *b* puts the vertex of the parabola left of the origin.

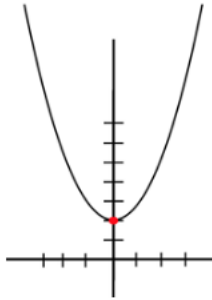A **negative** *b* puts the vertex of the parabola right of the origin.

C value :-

The c **value** gives us the y-intercept of the parabola. This is wherever the graph hits the y-axis (and will only ever be one point).

(Note: when $b=0$, the y-intercept will also be the location of the vertex of the parabola.)

Books To Refer:

1) A highly recommended book for doing well on the test is *Barron's NEW SAT*. This book walks a student through all aspects of the New SAT and is specially suited for the maths section. This book goes beyond the scope of SAT math in order to better prepare the reader for the test.

2) *Princeton Review* guides are no less. They have a combined guide as well as ones for individual sections of the SAT and provide numerous examples of questions. It's a book that's fun and easy to read.

Section-wise Books:

3) *Erica Meltzer's* Evidence-Based Reading and Writing books are remarkable. They provide explanations and examples of every single concept that could be tested on the SAT. There is not a better SAT English source.

4) *College Panda's* math guides are popular among students who take the SAT. However, The SitSat Academy advices its students to focus more on Khan Academy's math section and possible Barron's too, since these are more than sufficient to get a perfect score.

We wish our students the best of luck!

Stay calm and you'll get that dream score!

The SitSat Academy