

Time-saving Hacks

–for SAT Math Success–



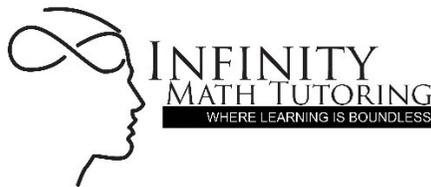
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Time Saving Hacks for SAT Math Success

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Introduction

The SAT is designed to be taken by every high school student in the country, which means it can only test math concepts that every student has had experience with.

The developers of the test make it hard is by presenting questions



in challenging and usual ways—ways that you never see in your math classes—**and by putting you on a time crunch.**

The SAT test is like a marathon. You have to maintain your mental fortitude, all while preserving time so that you can finish the

entire test.

If you've ever started freaking out at the end of the SAT Math section, we know your pain. You've finished about 75% of the section, and, before you know it, you only have 10 minutes left! Yikes!

Let's take a look at the time breakdown:

Section	Time in Minutes	# of Questions	Time per Question
Math—No Calculator	25	20	1 minute, 15 seconds
Math—Calculator	55	38	1 minute, 27 seconds

As you can see, time is not on your side. You have to conserve it while you utilize your math application skills.

But don't despair! In this guide, we'll walk you through the timing of the test and teach you how to beat the clock and maximize your time on the SAT Math section.

Tip #1: Eliminate Answers

The new SAT has 4 answers instead of 5. That's a big advantage to you. That's one less answer to eliminate!

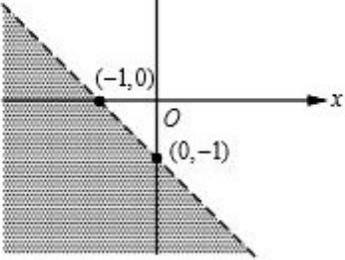


Elimination matters because these answers have a lot of repetition in them. When you see that kind of repetition, you have a HUGE opportunity to speed up the solving of that particular problem. Essentially, you

won't have to solve the entire problem, and then you can derive your answer from small parts of the problem that will allow you to eliminate certain answers. This will be a big help when you start to get to the end of the section, and is ENORMOUS TIME SAVER.

NOTE: This really comes in handy for the no-calculator section!

Let's take a look at an inequalities problem below:



Which of the following inequalities represents the graph above?

- A) $x + y < -1$
- B) $x + y > -1$
- C) $x + y \leq -1$
- D) $x + y \geq -1$

If you read the graph above from left to right, there are two features that stand out:

1) The line is dashed, which means the solution DOES NOT include the line. This eliminates the following notation: \leq and \geq . Thus, you can ELIMINATE choices C) and D)

2) The graph is shaded below the line, which is represented by $x+y$. In the slope-intercept form, $y < -x - 1$. Therefore, $x+y$ is less than -1 .

If you can see the features mentioned above right away, you can eyeball the answer to this problem! No writing or calculations necessary!

TIP #2: Replace With Numbers

This hack is a true classic! If you encounter a word problem that includes all variables and no numbers, it can be very daunting and a time drainer.

Putting numbers in place of the variables will open your eyes to possible solutions. The mental juices will start to flow!!



Check out the problem below:

If $\frac{r}{s} = 4$, then what is the value of $8\frac{s}{r}$?

A) $\frac{1}{4}$

B) 2

C) 1

D) 8

In order to find the value of the second expression, $8\frac{s}{r}$, you can assign numbers to r and s that produce 4.

Let's choose $r = 16$ and $s = 4$. Therefore $\frac{16}{4} = 4$

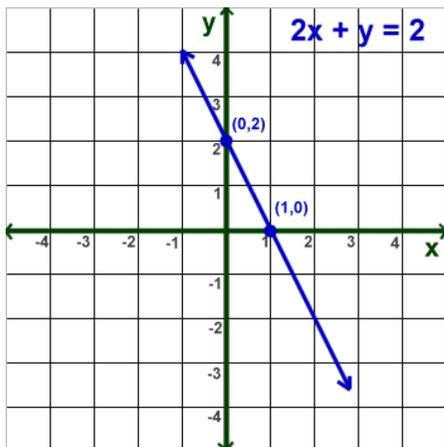
Let's take those values and plug them into $8\frac{s}{r}$. You get the following

$$8\frac{4}{16} = 2$$

Therefore, the answer is B)

As you can see, this very powerful strategy can be used on multiple choice questions as well as the grid-in questions.

TIP #3: Remember your linear equation short cuts!



Linear equations are part of the **Heart of Algebra** category, which accounts for the largest part of the Math section (33%). There are quite a few linear equation questions in that category, so it is good idea to know some time saver short cuts:

1) The slope shortcut

If a linear equation is in the standard form, don't waste time changing it to the slope-intercept form **to find the slope**. You can find it in the standard form

$$\text{When } Ax + By = C, \text{ slope} = -\frac{A}{B}$$

you don't need to change to $y = mx + b$

Example:

Which of the following is the equation of the line that passes through point $(4, -1)$ and has slope -2 ?

- A) $x + 2y = 2$
- B) $x - 2y = 6$
- C) $2x - y = 9$
- D) $2x + y = 7$

Each answer choice in the problem is a linear equation in standard form.

Using the formula, slope = $-\frac{A}{B}$, you will see that the last equation on the list will produce a slope of -2.

$$2x+y = 7, \text{ where } A = 2 \text{ and } B = 1$$

$$\text{Slope} = -\frac{2}{1} = -2$$

Therefore, the answer is D)

1) Parallel and Vertical Lines

Lines parallel to the y-axis are vertical and lines parallel to the x-axis are horizontal

Vertical line implies $x =$ coordinate which line goes through

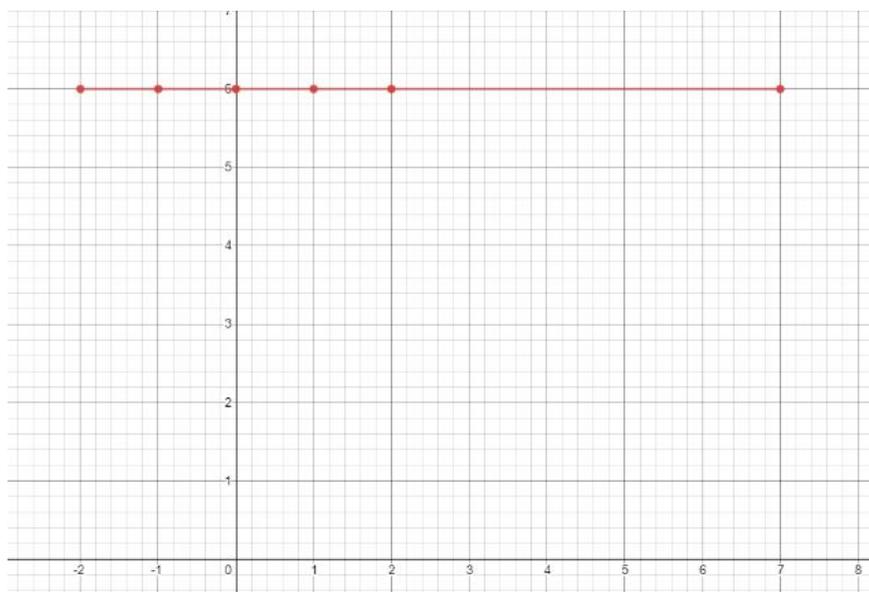
Horizontal line implies $y =$ coordinate which line goes through

Example:

Which of the following equations represents a line that passes through (7,6) and is parallel to the x-axis?

- A) $x = 6$
- B) $y = 7$
- C) $y = 7$
- D) $y = 6$

A line that is parallel to the x-axis is horizontal. Therefore, it goes through the y-axis. If the line passes through point (7,6), it will cross the y-axis at (0,6)



The line goes through the 6 on the y-axis, therefore the equation is $y = 6$

The answer to the example above is D).

TIP#4: Plan the Score You Want



Time conservation is a very crucial strategy to use for the SAT. You have 58 questions to answer in 80 minutes. Therefore, you get approximately 1 minute and 18 seconds for each question.

Each math section is arranged from easy

to hard, so knowing where you are tells you how hard the question is.

The most efficient strategy is to answer the easier questions, bubble in educated guesses for the harder questions (at the end of multiple-choice group), and consider skipping the end of the grid-ins (since you won't be able to guess on those since they're not multiple choice).

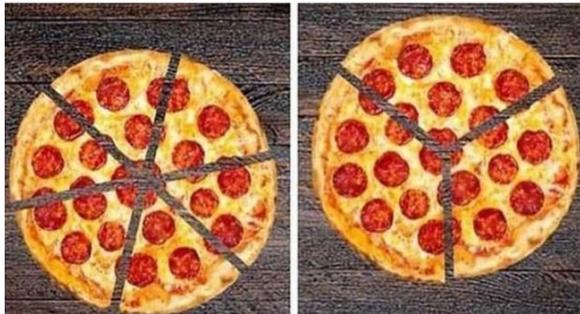
If you have a particular score target you want to reach based on your college admissions and scholarship requirements, then you can develop a strategy for correct questions vs. score achieved. Below is an approximate raw score to math section score conversion chart:

# of questions answered (raw score)	Math section score	# of questions answered (raw score)	Math section score	# of questions answered (raw score)	Math section score	# of questions answered (raw score)	Math section score
0	200	16	410	32	550	48	680
1	200	17	420	33	560	49	690
2	210	18	430	34	560	50	700
3	230	19	440	35	570	51	710
4	240	20	450	36	580	52	730
5	260	21	460	37	590	53	740
6	280	22	470	38	600	54	750
7	290	23	480	39	600	55	760
8	310	24	480	40	610	56	780
9	320	25	490	41	620	57	790
10	330	26	500	42	630	58	800
11	340	27	510	43	640		
12	360	28	520	44	650		
13	370	29	520	45	660		
14	380	30	530	46	670		
15	390	31	540	47	670		

Focus on getting the points from the easier questions, which are worth the same as the harder questions, but tend to take less time to solve.

TIP#5: Clear Out Those Fractions

I'm on a diet, i used to eat 6 slices of pizza, now i eat 3.



It's been said that fractions scare people to death! I've witnessed it during tutoring sessions.

Therefore, I always offer up the option to eliminate the fractions before my students start tackling the problem. I

also recommend this strategy for the SAT Math section.

Let's look at the following problem:

$$\frac{1}{3}x - \frac{3}{4}y = -11$$

$$\frac{1}{2}x + \frac{1}{6}y = -1$$

If (x, y) is the solution to the system of equations above, what is the value of $x + y$?

We will not solve this problem, but show how it can be made easier to solve by removing the fractions.

Since this is a system of equations, we need to remove the denominator from the terms of both equations. The first equation has the denominators, 3 and 4. **The least common multiple of 3 and 4 is 12.**

Multiples of 3: 3, 6, 9, 12, 15, 18

Multiples of 4: 4, 8, 12, 16, 20

The second equation has the denominators 2 and 6. **The least common multiple of 2 and 6 is 6.**

Multiples of 2: 2, 4, 6, 8, 10

Multiples of 6: 6, 12, 18, 24

In order to get rid of the fractions, multiply each equation by the least common multiple.

$$12\left(\frac{1}{3}x - \frac{3}{4}y = -11\right) \rightarrow 4x - 9y = -132$$

$$6\left(\frac{1}{2}x + \frac{1}{6}y = -1\right) \rightarrow 3x + 1y = -6$$

Now, don't those new equations look more doable! I know they do! When you come upon those distracting fractions--especially for linear equations—using the lowest common multiple always does the trick!

TIP#6: Know your English to Math Translations

In order to master the word problems on the SAT, you MUST be fluent in two languages, English and Math. You must know how to translate English into math language. This way, you can understand exactly what a problem is asking you to find and how you're supposed to find it. Below is a chart of **english-to-math translations** that are very popular on the SAT:

Symbol	Word/Phrase	Example	
		Verbal	Symbolic
+	the sum of more than increased by total	the sum of 5 and x 10 more than 13 4 increased by total of 12 and 25	$5 + x$ $10 + 13$ $4 + n$ $12 + 25$
-	the difference less than decreased by subtract from	the difference of 10 and 15 4 less 16 9 decreased by x subtract 7 from 13	$10 - 15$ $16 - 4$ $9 - x$ $13 - 7$
×	product times of twice	the product of x and y 11 times n one-half of x twice n	xy $11n$ $\frac{1}{2}x$ $2n$
÷	the quotient of divided by half of split evenly	the quotient of 30 and 5 14 divided by x half of n 70 split evenly between 5 people	$30 \div 5$ $14/x$ $n/2$ $70 \div 5$
≤	less than or equal to no more than does not exceed	x is less or equal to 10 The sum of x and y is no more than 20 The product of 2 and x does not exceed 8	$x \leq 10$ $x + y \leq 20$ $2x \leq 8$
≥	Greater than or equal to no less than is at least	x is greater than or equal to 40 the quotient of n and 4 is no less than 50 p is at least 100	$x \geq 40$ $n/4 \geq 50$ $p \geq 100$

check out the example below:

In a school election, 680 students voted for one of two candidates for president. If the winner received 120 more votes than the loser, how many votes did the winner receive?

What keyword stands out to you...one that tells you what operation to use? The word **more** was used, which implies that you should use **addition**.

Because this is a word problem, **we have to identify a variable to represent the unknown**. Let's use x for the numbers of losers.

$$x = \text{number of votes for loser}$$

$$x+120 = \text{number of votes for winner}$$

$$\text{total votes} = \text{loser votes} + \text{winner votes} = 680$$

$$x+x+120 = 680$$

Algebra time!!

$$2x + 120 = 680 \quad \text{subtract 120 from both sides}$$

$$2x = 560 \quad \text{divide both sides by 2}$$

$$x = 280$$

$$\text{winners} = x+120 = 280+120 = \mathbf{400}$$

Conclusion: The variable assignment and equation set-up are critical for this problem. Interpreting the word "more" into "addition" is the most critical.

Time to Apply Your Hacks!

1) The sum of $125k$ and $200j$ does not exceed 2500.

Which of the following inequalities represent the statement above?

- A) $125k + 200j < 2500$
- B) $125k + 200j > 2500$
- C) $125k + 200j \leq 2500$
- D) $125k + 200j \geq 2500$

2) Given the equation below, if $s = 2$, what is the value of r ?

$$\frac{r}{3} + \frac{s}{11} = \frac{39}{33}$$

3) What is the slope of the line in the equation below?

$$-x + 4y = 6$$

4) Which of the following equations represents a line that passes through $(-5, 1)$ and is parallel to the y -axis?

- A) $y = -5$
- B) $y = 1$
- C) $x = -5$
- D) $x = 1$

Answers:

- 1) C 2) 3 3) $\frac{1}{4}$ 4) C

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About the Author



Stephanie Mitchell is the founder of Infinity Math Tutoring. She has enjoyed the personal gratification of tutoring since high school. Since 15 years old, she has shared her knowledge and love of mathematics with people of all ages. She attended Spelman College and Georgia Institute of Technology, where she received her Bachelor of Science in Mathematics and Mechanical Engineering, respectively.

She has administered ACT and SAT test prep in both 1-on-1 and large group settings. She has fostered score increases as high as 13 points on the ACT and 300 points on the SAT.

Her goal is to help students understand the foundation and theory behind math concepts, so that they can tackle any math problem with ease and confidence. Confidence is key!