

THE ULTIMATE DESMOS CHEAT SHEET

Learn how to use Desmos to its full potential and increase your SAT score.

Acely

Using Desmos to Your Advantage on the SAT: A Comprehensive Guide

Unless otherwise stated, image credits to [Desmos](#)

Introduction

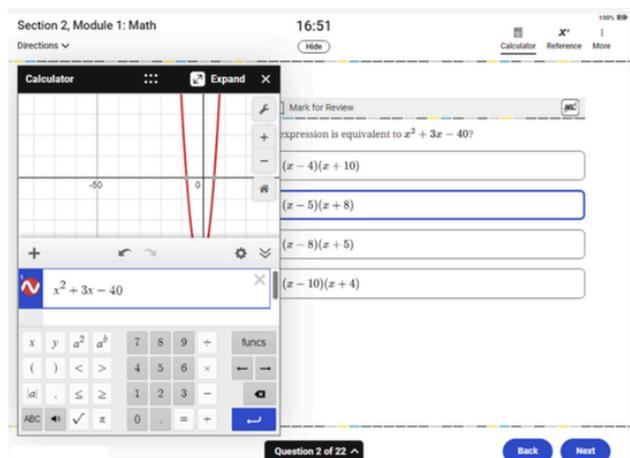
On the digital SAT, Desmos is a game-changer for the math section. This graphing calculator is accessible throughout the entire math section, enabling both quick calculations and complex function graphing. In this guide, you'll learn how to use Desmos to your advantage on the SAT.

What is Desmos?

Desmos is a versatile online graphing calculator. It provides a dynamic platform where users can create, visualize, and analyze mathematical graphs and functions. Desmos allows for the easy input and editing of equations, graph manipulation using sliders, and the ability to graph inequalities.

Accessing Desmos on the SAT

- Accessing Desmos on the SAT is extremely simple, and you have access to this digital calculator the entire duration of the math section.
- To access this calculator, simply press the calculator icon and the Desmos calculator will be pulled up on the screen.



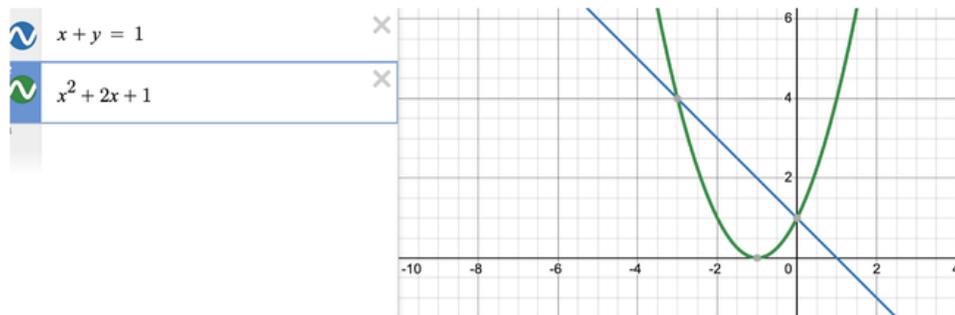
Source: <https://www.applerouth.com/blog/key-features-of-college-boards-bluebook-app>

Features

- **Basics:** You can use Desmos to complete basic computations. You can take the square root with the radical sign (or type “sqrt”), raise numbers to a power with the a^2 (to square a base) or a^b (to raise a base to a power that is not 2) features, and take the absolute value of a number or equation with the $|a|$ button. Of course, you can do basic computations as well, such as addition, subtraction, multiplication, and division, and, on the SAT, you may want to use Desmos to solve basic calculations as doing them by hand can waste time.

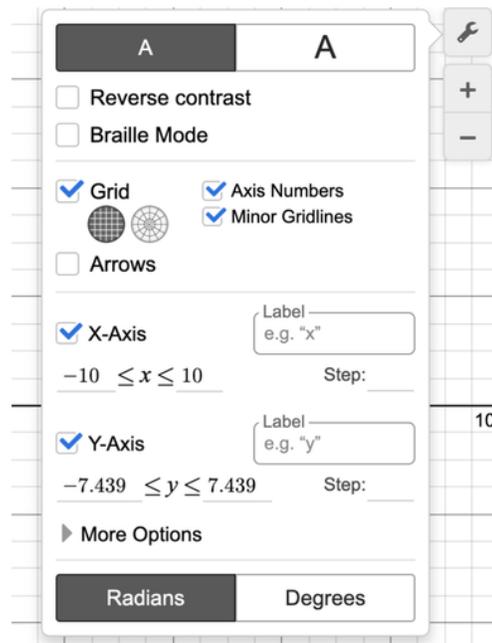
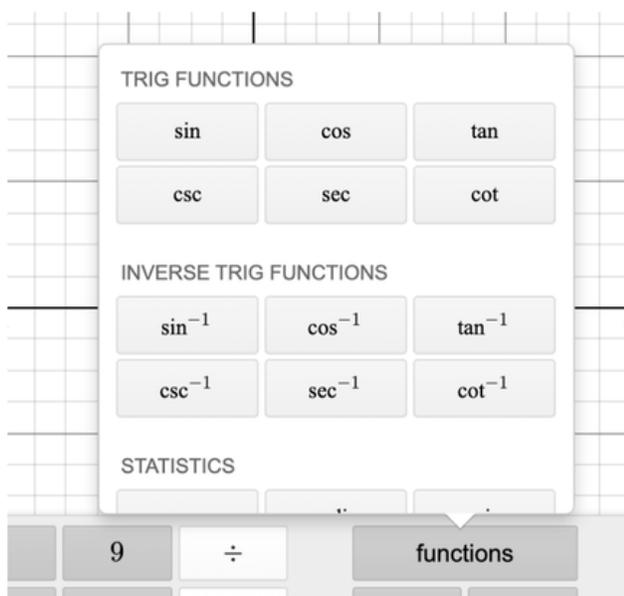
Graphing Functions

- **Inputting and editing equations:** To input an equation, simply type with your device’s keyboard or press the corresponding buttons on the Desmos screen. For example, to write an equation for a line, you might write $3x + 4$ or (you do not need to write the “ $y =$ ” part, but doing so leads to the same answer as well) or $x + y = 1$, and then that line will be shown on the screen. You can graph any function just like you would on your handheld graphing calculator. You can also graph different functions and they will be shown on the same screen in different colors

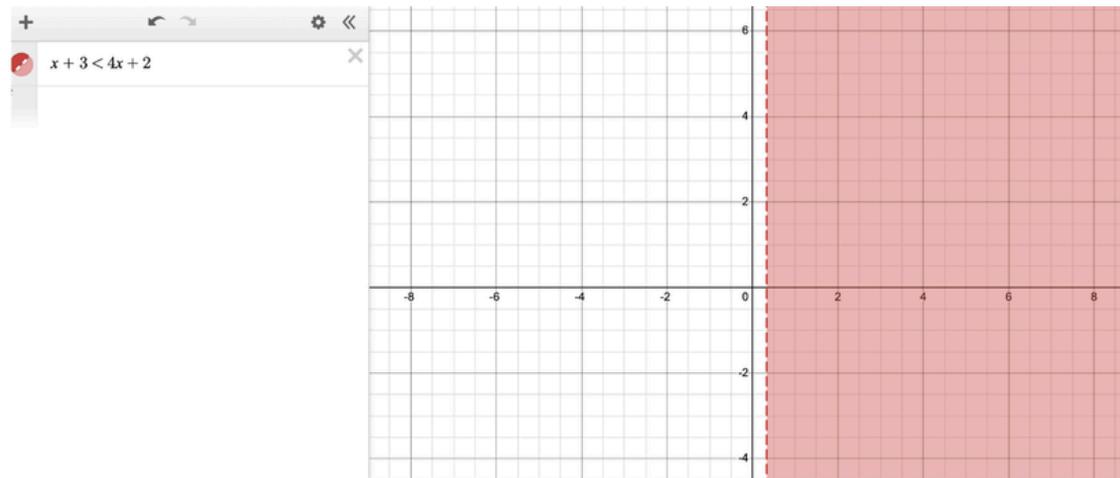


- **Viewing and interpreting graphs:** To view different points on a graph, simply click and scroll along the graph. Desmos will show important points (intersections, minimums or maximums, etc) with a grey point that you can click on to identify the values. You can zoom in or out on the graph by using two fingers or by pressing the + and - icons in the upper right corner.

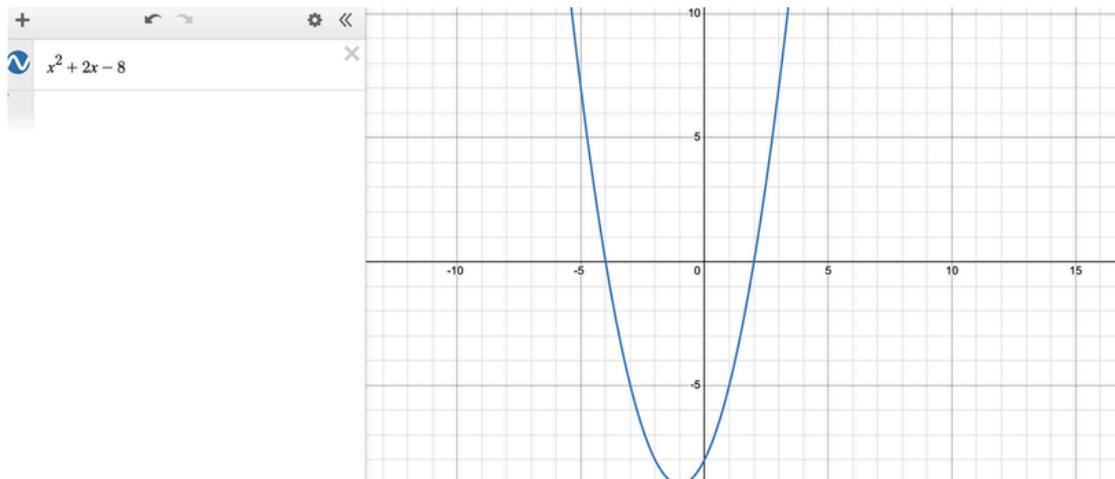
- **Trigonometry functions:** Desmos also provides the ability to calculate trigonometric equations. To access these functions, simply click the “functions” tab and find the “trig functions” label. Underneath will contain sin (sine), cos (cosine), tan (tangent), csc (cosecant), sec (secant), and cot (cotangent). To use these, click on your desired function and input the value you are evaluating.
 - When it comes to evaluating trigonometric functions, it is important to know if radians or degrees are required. The question will tell you which form, degrees or radians, to set Desmos. To change the form, click the wrench icon in the upper right corner and select either degrees or radians.



- **Inequalities:** Inequalities are another type of function that Desmos can help you solve within seconds. To solve, type in your inequality, using the greater than, less than, greater than or equal to, or less than or equal to features on the Desmos keyboard. Then, Desmos will graph the answer. For example, if the answer is $x < 3$, all values less than 3 will be shaded and there will be a dotted line at 3. If the answer is greater/less than or equal to, there will be a complete line at the value that x could be equal to (in this case, 3), but if the answer is just greater/less than, there will be a broken line.

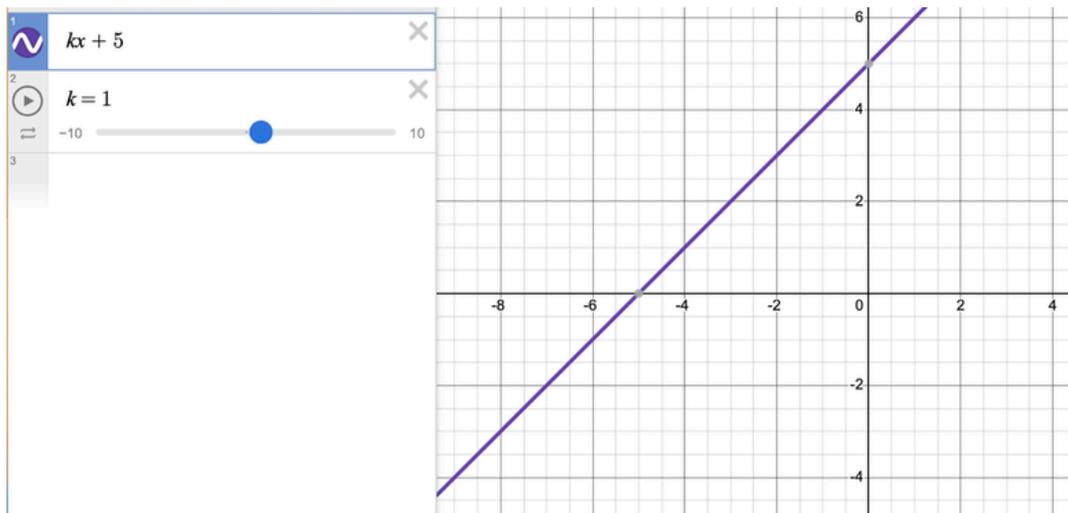


- **Quadratics:** With Desmos, you often no longer need to solve quadratic equations by hand. To solve quadratic equations, simply graph your quadratic and note the x-intercepts — these will be your solutions.
 - Other times, you will be asked to find the vertex of the quadratic. Similarly, you can just graph the quadratic and find the maximum or minimum point — this will be your vertex.



Interactive Sliders

Creating and using sliders to change variables: Another useful feature that Desmos supplies is the ability to use sliders to change the value of variables. For example, you can write $kx + 5$, and a slider will be shown for the “k” value. You can then change the “k” variable to various values until the conditions you seek are met. For example, maybe you are looking for a line with a y-intercept of 5; to find this, you could play around with the value of k on the slider until you find that $k = 1$ when the y-intercept = 5. This can be immensely helpful on the SAT as many questions will include equations with variables in place of numerical values.



Utilizing Desmos on the SAT

Prior to test day, you should feel very comfortable using Desmos if you plan to use it during the SAT. Make sure to practice solving questions using Desmos during your studying time.

Desmos Shortcuts

By typing in these shortcuts, you'll get the indicated feature.

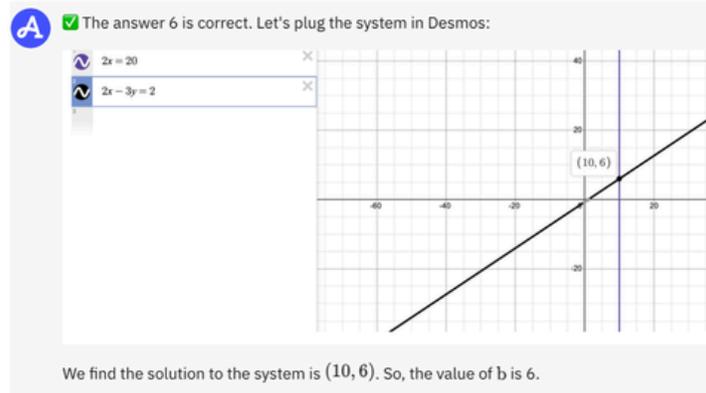
- **shift + 6:** exponent
- **sqrt:** square root
- **cbt:** cubed root
- **nthroot:** "nth" root
- **table:** creates a table to add points
- **pi:** adds the pi value
- **frac:** creates an empty fraction
- **< = : ≤**

When to Use Desmos

- **Systems of Equations and Intersections:** Solving systems of equations with Desmos should be your go-to strategy for these problems. To solve, simply plug in each equation into Desmos and find the intersection point. This will tell you both the x and y values that solve this system.
 - Intersections are the same deal. Plug in the equations and find the spot in which the functions meet. This will be your answer.

$$2x = 20$$
$$2x - 3y = 2$$

If (a, b) is the solution of the system of equations above, what is the value of b ?

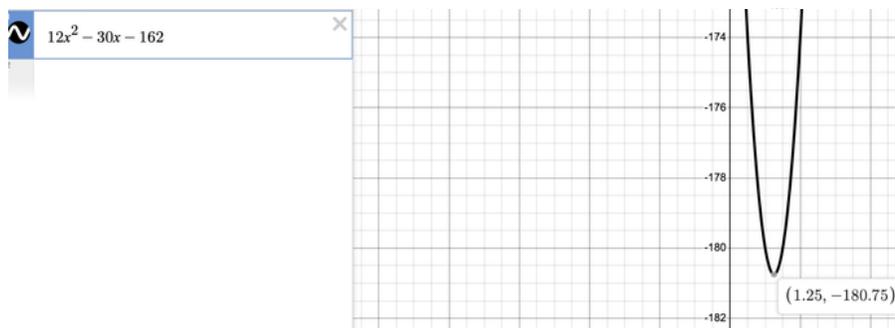


- **Solving Quadratics:** Finding the solution to quadratics is also made significantly easier with the use of Desmos. All you need to do is plug in the quadratic equation and find the x -intercepts. These intercepts will be the solution.
 - Sometimes, a question on the SAT will ask for a quadratic with one solution, two solutions, or no solutions. In some cases, there will be a quadratic such as $ax^2 + bx + c$ and you will be asked to find the correct value of a , b , or c that makes the quadratic have one, two, or no solutions. To solve these types of problems, you can plug in the answer choices to your quadratic function graph or use the slider feature to test out various numbers.

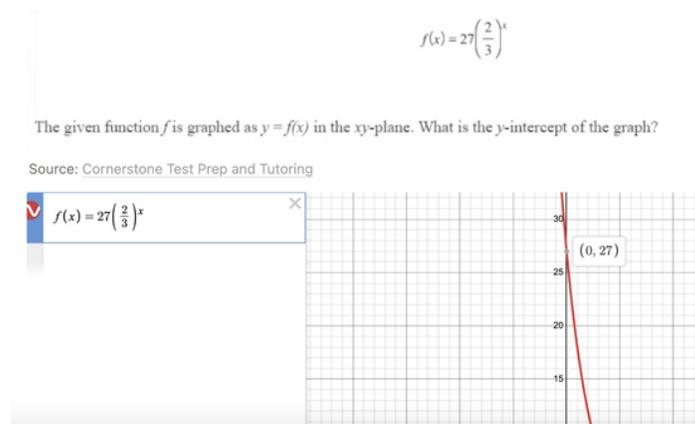
The function f is defined by $f(x) = 12x^2 - 30x - 162$. For what value of x does $f(x)$ equal its minimum value? _____

Answer:

Source: Cornerstone Test Prep and Tutoring



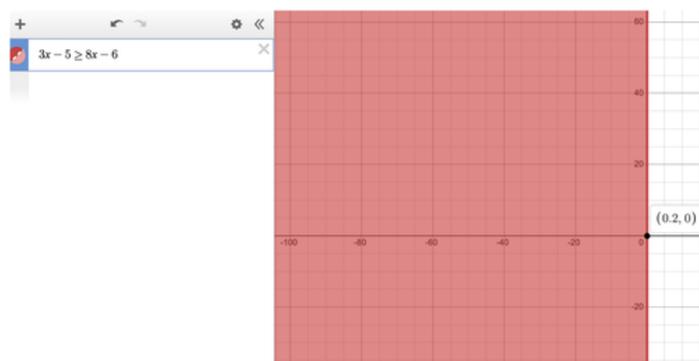
- **Exponential Functions:** A question may ask to find a certain value on an exponential function graph when given the equation, such as the y-intercept. For these questions, it can be helpful to plug in the given equation and note the desired value.



- **Inequalities:** You are often able to solve systems of inequalities or other inequality problems using Desmos. To do this, simply plug in the equation(s) and note the points that correspond to the solution. If you are solving a system of inequalities, the solutions will be the points where both shaded regions overlap. If there is no overlap, then there is no solution. For a regular inequality, the solution is simply the points with the shaded region.

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 8x - 6$?

- A) -5
- B) -1
- C) 0
- D) 1



Because the graph shows that the solution is all values less than 0.2, the answer must be D, because 1 is NOT a solution.

- **Statistics:** You can use Desmos to calculate mean, median, mode, and standard deviation by plugging values into a statistics function. When given a set of values, go to the “functions” tab and scroll down to the Statistics section. From there, you can click the function you are looking for (such as mean), and then you can input your values, separating each with a comma.



The above image depicts calculating the standard deviation of the data set with values of 1, 2, and 3.

- An alternative way to find these measurements is to create a table of values based on your data set and then plug this table into the statistical functions. To do this, first click the + sign in the upper left corner and hit table. From there, input your values, inputting your data set into either the x or y columns. Next, just like the previous technique, click on the functions tab and go to the statistics section, then input whatever measurement you are looking for (mean, median, mode, or standard deviation). In the parentheses of the function, you will input the name of the column, such as x_1 .

