

The Desmos Playbook

Six moves for the built-in graphing calculator

Desmos is a **graphing engine**, not a scientific calculator. It already solves most SAT math problems for you, as long as you type them in the right way. These are the six patterns we teach every student, in order of how often they come up.

1 Split-and-Intersect

ANY SINGLE-VARIABLE EQUATION

Put the **left side** on line 1 and the **right side** on line 2. Where the curves cross, the x -coordinate is your answer.

Works for radicals, absolute value, exponentials, logs. You never have to isolate the variable.

Solve $\sqrt{2x+5} = x-1 \rightarrow$ type $y = \text{sqrt}(2x+5)$ and $y = x - 1$, click the gray intersection dot.

2 Systems in Two Lines

SYSTEMS OF EQUATIONS OR INEQUALITIES

Type both equations **exactly as written**, even if they aren't in $y =$ form. Desmos graphs implicit equations without any rearranging.

For inequalities ($>$, $<$), Desmos shades the solution region for you. The overlap is the answer set.

Wondering if a point (a, b) satisfies the system? Plot it with (a, b) . If the dot lands in the overlap, it works.

3 Vertex & Roots on Tap

PARABOLAS, MAX/MIN, PROJECTILE MOTION

Graph the quadratic in any form: standard, factored, or vertex. Desmos highlights the **vertex**, **x-intercepts**, and **y-intercept** as gray dots.

Click any gray dot for the exact coordinates. No completing the square, no quadratic formula.

"When does the ball hit the ground?" $\rightarrow$ click the positive x -intercept. "Max height?" $\rightarrow$ click the vertex's y -value.

4 Circles in Disguise

EXPANDED CIRCLE EQUATIONS

The SAT loves messy circle equations like $x^2 + y^2 - 6x + 8y + 9 = 0$. Skip the algebra. Type it exactly as written.

Desmos draws the circle. Click the center for (h, k) , then click the topmost point to read the radius.

Center $(3, -4)$, radius 4. Two seconds of clicking instead of a page of algebra.

5 Slider the Unknown

"FOR WHAT VALUE OF k ..." PROBLEMS

Type the equation with an unknown letter in it. Desmos offers "add slider". Click it.

Drag until the graph matches the condition, whether that's one solution, tangency, or passing through a given point. Read k off the slider.

"For what k does $y = x^2 + k$ touch $y = 2x$ exactly once?" $\rightarrow$ slide k until the curves kiss.

6 The Tilde Trick

TABLES, BEST-FIT, "WHICH FUNCTION MODELS..."

Make a table ($+$ icon $\rightarrow$ table). Enter the data. Below it, type a model using $\sim$ instead of $=$:

$y_1 \sim a \cdot b^{x_1}$ for exponential, $y_1 \sim ax_1^2 + bx_1 + c$ for quadratic. Desmos solves for every constant.

Works even without a table: plot two points, then regress to the exact model the answer choices want.

The 15-Second Rule

Only open Desmos when you already know **exactly what to type** and **exactly what the graph will tell you**. Fumbling is slower than the hand calculation you were trying to avoid. Practice these six moves inside Bluebook until they're automatic, well before test day.

The Desmos Playbook • Pro Moves

Syntax, advanced techniques, and the mistakes that cost points

Keyboard Syntax You Need Cold

WANT	TYPE	WANT	TYPE
Exponent	<code>^</code> (Shift+6)	Fraction template	type <code>frac</code>
Square root	<code>sqr t (. . .)</code>	Cube root	<code>cbr t (. . .)</code>
Pi	<code>pi</code>	Absolute value	<code>abs (x)</code>
$\leq / \geq$	<code><=</code> / <code>>=</code>	Distance between points	<code>distance ((1 , 2) , (4 , 6))</code>
Domain restriction	append <code>{ x > 0 }</code>	Mean / median of list	<code>mean ([...])</code> , <code>median ([...])</code>
Define a function	<code>f (x) = 2x + 3</code> , then <code>f (5)</code>	Regression (any model)	use <code>~</code> , not <code>=</code>

Pro Moves

Answer Choices as Points

For "which (x, y) is a solution," type all four choices as coordinate pairs. The one that lands on the curve wins — no plugging in.

Equivalent Expressions

Graph two expressions on separate lines. If they're equivalent, the graphs overlap exactly. If they diverge anywhere, they're not equal.

Shift to Zero

For "find x where $f(x) = k$," graph `y = f ( x ) - k` and click the root. One line instead of two. Especially nice on grid-ins where you want the x -value and nothing else.

Function Shorthand

Define `f ( x ) = ...` once, then ask Desmos for `f ( 3 )` , `f ( -1 )` , or `f ( a + 2 )` instantly. Perfect for table-completion questions.

Translations & Shifts

Graph `y = f ( x )` , then `y = f ( x - h ) + k` with sliders for h and k . Watch the shape move to match the described transformation.

Two Sliders for Two Unknowns

Word problems with two conditions and two unknowns? Make both variables into sliders. Drag one until the first condition is satisfied, then the other until the second one is, too.

Gotchas That Cost Points

Decimals vs. Fractions / Radicals

Desmos shows `1.414...` when the answer choice wants $\sqrt{2}$. Memorize the common ones: $\sqrt{2} \approx 1.414$, $\sqrt{3} \approx 1.732$, $\pi \approx 3.14$.

Radians vs. Degrees

The wrench icon (top right) toggles the mode. Trig questions quietly assume radians unless a degree symbol appears. Check before you graph.

Implicit Multiplication

`2 ( x + 1 )` works. `2x` works. But `xy` is one variable named "xy." Type `x * y` , or put a space between the letters.

Off-Screen Graphs

If nothing appears, zoom out with the minus button or click the double-arrow icon to auto-fit. Don't assume Desmos "couldn't solve it."

When You Sit Down at a Problem

1. **Read the whole question first.** Decide what a correct answer would *look like*: a number, a point, an equation.
2. **Ask: can I see this on a graph?** If yes, type it into Desmos exactly as written. If no, as in pure arithmetic or a one-step algebra problem, solve by hand. It's faster.
3. **Name the gray dot you're going to click:** intersection, vertex, root, or a coordinate. That dot is the answer.
4. **Translate the format.** Desmos gives decimals. If the choices are fractions or radicals, convert before you bubble.

How to Practice

Open Bluebook. Take every practice test using Desmos, not a handheld calculator, even on problems you could solve faster by hand. You're not learning math at this point, you're building reflexes for which button to hit first. After two full practice tests inside Desmos, the pacing feels completely different.