Top 75 Hard

The hardest Digital SAT Math questions, each solved step by step, with the Desmos lines typed into the real calculator.

Ronak

75 QUESTIONS · 2ND EDITION

MULTIPLE CHOICE

03 Algebra

TARGET 1:30

QUESTION 3

The function v is defined by $v(x) = \dfrac{x^2 + bx + c}{(x + 5)(x - 17)}$, where b and c are

In the xy-plane, the graph of $y = v(x)$ passes through the points $\left(0, \frac{77}{85}\right)$ and $(11, 0)$. If $v(q) = 0$, which of the following could be the value of q?

(A) -7 (B) -5 (C) 5 (D) 7

MY CALL ☐ Desmos ☐ Formula ☐ Both Mistake label

WORK SPACE

Solution · Q4 DESMOS

SPEEDRUN PLAYBOOK · SKILL 2
Four ways to evaluate and solve

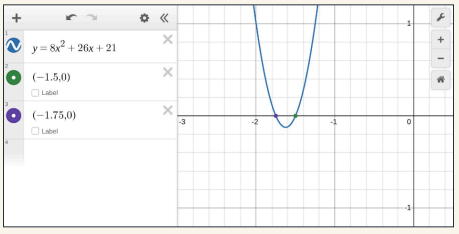
CAREFUL
Do not run a free factoring regression here. Desmos can return $(4x^2 + 6)(2x^2 + 3.5)$. It multiplies out correctly, but the question wants integers.

1 Treat x^2 as one letter

Then the expression is an ordinary quadratic, $8u^2 + 26u + 21$. Graph it and click the zeros.

TAB 1 `y = 8x^2 + 26x + 21`

→ Zeros: -1.5 and -1.75, which are $-\frac{3}{2}$ and $-\frac{7}{4}$



Real Desmos screen

2 Turn the zeros into factors

$u = -\frac{3}{2}$ gives $(2u + 3)$ and $u = -\frac{7}{4}$ gives $(4u + 7)$. Check: $2 \cdot 4 = 8$ and $3 \cdot 7 = 21$.

3 Put x^2 back

$8x^4 + 26x^2 + 21 = (2x^2 + 3)(4x^2 + 7)$.

4 Compare with $ax^2 + b$

Either $a = 2$, $b = 3$, so $ab = 6$, or $a = 4$, $b = 7$, so $ab = 28$. Only 28 is a choice.

By hand: split the middle term with two numbers that multiply to $8 \cdot 21 = 168$ and add to 26: 12 and 14. Then $8x^4 + 12x^2 + 14x^2 + 21 = 4x^2(2x^2 + 3) + 7(2x^2 + 3)$.

ANSWER D

STUCK IN SAT · MATH LIBRARY

Top 75 Hard

75 of the hardest Digital SAT Math questions, each with a full solution and the Desmos walk-through.

Ronak · Second Edition, 2026

75	15	37	23
hard questions, every one solved from zero	where Desmos is the fastest way	where one line by hand wins	that need both

WHAT IS NEW IN THIS EDITION

- It was the Top 50. Now it is 75: 29 new questions built on the hard question types from the most recent tests.
- Every question from the first edition was solved again from zero. The four that were not really hard were replaced.
- Every Desmos input in the solutions was typed into the real calculator. The screenshots are from desmos.com.

© 2026 Stuck in SAT. All rights reserved. No part of this book may be reproduced, distributed, or transmitted in any form or by any means without prior written permission, except for brief quotations in reviews.

SAT® is a trademark registered by the College Board, which is not affiliated with, and does not endorse, this book. Desmos is a trademark of Desmos Studio PBC. This book is an independent educational resource.

HOW TO USE THIS BOOK

Reading solutions will not move your score. Doing them will.

This book is built to push your SAT Math score into the 750+ range. Follow the 48-hour loop.

1 **Set a timer. Do 10 questions in one sitting.**
No peeking at solutions. Use the work space under each question. Mark any guesses.

2 **Make the call before you solve.**
Under each question, tick Desmos, Formula or Both. Deciding is a skill, and the exam never tells you.

3 **Grade honestly.**
Check the answer and the call. Our label is the fastest safe route for most students. If you were right but slow, learn ours. For every miss, study the steps and type the Desmos lines yourself.

4 **Write a one-line mistake label.**
For example: "stopped at 650, the question asked for a percent" or "forgot the answer had to be odd".

5 **Wait 48 hours. Then redo the same set.**
Without looking at the solutions. A question is finished when you can explain it out loud.

Desmos, formula, or both?

Almost 90% of our students ask the same two things: how do I remember all the tricks, and how do I decide in the exam whether a question is Desmos, by hand, or both? This book answers the second one 75 times. Use Desmos as a tool, not as your only weapon: on your second attempt, try each problem both ways.

DESMOS

Desmos

Numbers in, a number out.

- Solve an equation or a system
- A table of values to an equation
- An unknown constant: regression with $\sim$
- Percent chains

FORMULA

Formula

One line by hand beats typing.

- Geometry with no coordinates
- Ratio rules: k, k^2, k^3
- Sum and product of roots
- Letters in, letters out

BOTH

Both

Formula sets it up, Desmos finishes.

- A geometry fact first, then heavy arithmetic
- Exactly one solution, when the answer is exact like 7.75
- Equations with a false solution

Your scoreboard

Two boxes per question: tick the first when your answer is right, the second when your call (Desmos, Formula or Both) matches ours. Redo every question with an empty box after 48 hours.

ALG Algebra · ADV Advanced Math · DATA Problem-Solving and Data Analysis · GEO Geometry and Trigonometry

1 ALG ☐☐	2 ALG ☐☐	3 ALG ☐☐	4 ALG ☐☐	5 ALG ☐☐	6 ADV ☐☐	7 ADV ☐☐	8 ADV ☐☐	9 DATA ☐☐	10 ALG ☐☐	11 ALG ☐☐	12 ADV ☐☐	13 ALG ☐☐	14 ADV ☐☐	15 ALG ☐☐
16 ALG ☐☐	17 ADV ☐☐	18 DATA ☐☐	19 ADV ☐☐	20 ADV ☐☐	21 GEO ☐☐	22 ADV ☐☐	23 DATA ☐☐	24 GEO ☐☐	25 GEO ☐☐	26 ADV ☐☐	27 ADV ☐☐	28 ADV ☐☐	29 GEO ☐☐	30 ALG ☐☐
31 ADV ☐☐	32 ADV ☐☐	33 ADV ☐☐	34 ADV ☐☐	35 ALG ☐☐	36 ADV ☐☐	37 ALG ☐☐	38 DATA ☐☐	39 GEO ☐☐	40 ADV ☐☐	41 ALG ☐☐	42 ADV ☐☐	43 GEO ☐☐	44 ADV ☐☐	45 GEO ☐☐
46 ADV ☐☐	47 ADV ☐☐	48 ADV ☐☐	49 ALG ☐☐	50 ALG ☐☐	51 GEO ☐☐	52 GEO ☐☐	53 GEO ☐☐	54 GEO ☐☐	55 GEO ☐☐	56 GEO ☐☐	57 GEO ☐☐	58 GEO ☐☐	59 ALG ☐☐	60 GEO ☐☐
61 GEO ☐☐	62 GEO ☐☐	63 GEO ☐☐	64 GEO ☐☐	65 ALG ☐☐	66 ADV ☐☐	67 ADV ☐☐	68 ADV ☐☐	69 ADV ☐☐	70 ADV ☐☐	71 DATA ☐☐	72 DATA ☐☐	73 DATA ☐☐	74 DATA ☐☐	75 DATA ☐☐

01

STUDENT-PRODUCED RESPONSE

Algebra

TARGET 1:30

QUESTION 1

A circle in the xy-plane has the equation $(x + 3)^2 + (y - 8)^2 = 25$. Line k is tangent to the circle at the point $(1, 5)$. Line k is the graph of the linear function $k(x)$. For what value of x does $k(x) = 12$?

YOUR ANSWER

MY CALL ☐ Desmos ☐ Formula ☐ Both Mistake label .....

WORK SPACE

Solution · Q1 BOTH

SPEEDRUN PLAYBOOK · SKILL 11
Circle from its graph: midpoint and distance

1 Plot the circle and the key points

Type the circle and the point of tangency so you can see the problem.

```
TAB 1   (x+3)^2 + (y-8)^2 = 25
TAB 2   P = (1, 5)
TAB 3   C = (-3, 8)
```

2 Find the two slopes

The radius from C to P has slope $m = \dfrac{5-8}{1-(-3)} = -\dfrac{3}{4}$. A tangent is perpendicular to the radius, so its slope is the negative reciprocal: $M = \dfrac{4}{3}$.

3 Define the tangent as a function

Point-slope form through $(1, 5)$. Defining it as $k(x)$ lets you use it again in the next line.

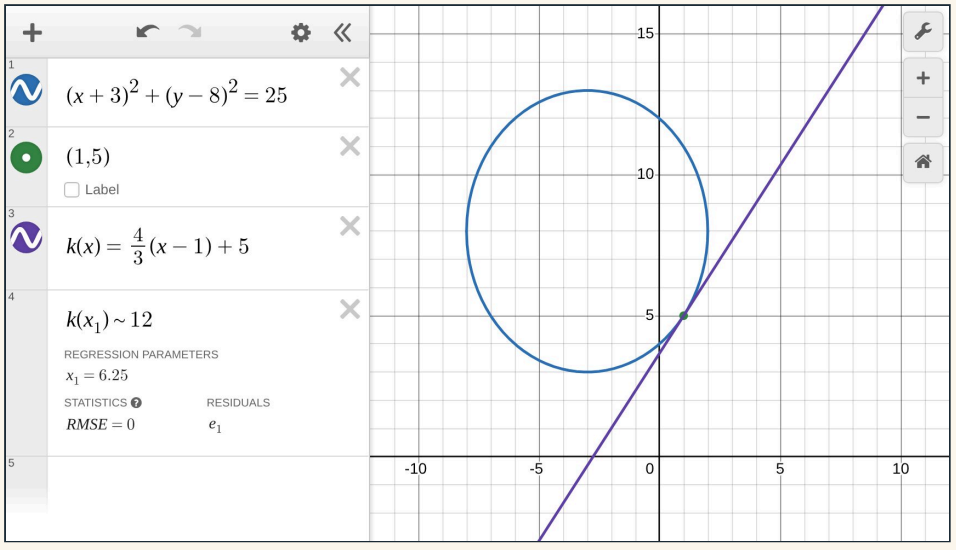
```
TAB 4   k(x) = (4/3)(x-1) + 5
```

4 Solve $k(x) = 12$

A regression solves it in one line. You can also graph $y = 12$ and click the intersection.

```
TAB 5   k(x1) ~ 12
```

→ Desmos output: $x_1 = 6.25$



Real Desmos screen

By hand: $\dfrac{4}{3}(x-1) + 5 = 12$ gives $x - 1 = 5.25$, so $x = 6.25$.

ANSWER 6.25 **or** $\dfrac{25}{4}$

STUDENT-PRODUCED RESPONSE

02 Algebra

TARGET 2:00

QUESTION 2

x	$g(x)$
4	9
2	0

The table gives two values of x and their corresponding values of $g(x)$, where $g(x) = \dfrac{f(x) + 5}{x + 8}$ and f is a linear function. What is the y-coordinate of the y-intercept of the graph of $y = f(x)$ in the xy-plane?

YOUR ANSWER

MY CALL ☐ Desmos ☐ Formula ☐ Both Mistake label .....

WORK SPACE