DEC 5 SAT MATH PREDICTED PACK

# Dec 5 SAT Math: every type, one pack.

Before Nov 7 we published 25 predicted question types. From what students reported after the test, **22 of the 25 showed up** (17 clearly, 5 partly). This pack is built from the August, September, October and November SAT trends: the full Nov 7 report, the 8 types Nov 7 added, and all 25 of our types again, because they keep coming back. 32 types to drill, each with a base question, a Module 2 hard question, full solutions, Desmos steps where Desmos helps, and the slip students make under pressure.

| Part | What's inside |
|---|---|
| 1 | The Nov 7 analysis: what came, US vs international, Module 1 vs Module 2 |
| 2 | Our 25-type scorecard against Nov 7 |
| 3 | 8 NEW types Nov 7 added (not on most lists, including ours), 16 questions |
| 4 | 10 types Nov 7 confirmed, in the harder Nov 7 style, 20 questions |
| 5 | 14 more types from our 25 that keep coming back, 28 questions |
| 6 | Answer key, full solutions, Desmos steps, slips |
| 7 | A 10-day plan to Dec 5 |

Honest note: these are likely types, not the paper. Every question is our own, written in the SAT format. Nothing here is College Board text, and no leaked material was used. Questions on Dec 5 will differ; the skills won't.

# Part 1 · What Nov 7 actually tested

After the test we went through what hundreds of students recalled about their papers. Numbers changed between forms; the types did not.

- **Module 1 was easy for most students.** Several US forms ended Module 1 with a rectangle-from-3-points area question.
- **US Module 2 was the pain:** geometry and trig heavy ("so much geometry!", "I got like 5 triangle questions in M2", "least Desmos-able test"). Several 790–800 scorers called it the hardest Module 2 they had seen.
- **International Math felt easier** than October and August for most students; English Module 2 was their pain.
- **The last question of Module 2** on both US and international forms: a table of values of f(x) + k, find the y-intercept of f (Part 3, type 4).
- **The most-argued question:** parallel lines, an angle split into x and y, and a range for x + y + z (Part 3, type 1).
- **Desmos still helped** on regressions, systems and checks, but fewer questions could be solved by graphing alone. Dec 5 rewards students who know the geometry facts cold.

# Why "easy" and "hardest ever" both appeared

The SAT is adaptive. Students who did well in Module 1 got the harder Module 2, so the strongest students reported the hardest test. If Module 2 felt brutal, that is usually a good sign about Module 1.

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# What this means for Dec 5

- Expect the Nov 7 types to come back in new numbers: exponential % change over several steps, similar figures, trig with an altitude, mixtures by mass, mean vs median with an outlier.
- Expect more geometry facts with an inequality twist (ranges, "which could be", "I / II / both").
- Learn one Desmos regression move cold: it solves the table questions in 20 seconds.

# Part 2 · Our 25 predicted types vs Nov 7

| # | Type | Nov 7 | What students reported |
|---|---|---|---|
| 2 | Similar shapes k, $k^2$, $k^3$ | Seen | Trapezoids ×9 → area ×81; rectangles 27:53 |
| 3 | Circle equations | Seen | Translate circle A to B |
| 5 | Percent chains | Seen | 77% of 5,048; 2022→2023 chain |
| 6 | Exponential % change | Seen | f(n+1) 19% less than f(n) |
| 7 | Surface area → dimension | Seen | Prism lateral area → volume (US) |
| 9 | Right-triangle trig | Seen | sin a = 40/41 → tan b |
| 11 | Discriminant | Seen | "so many discriminants" |
| 12 | No / infinitely many solutions | Seen | $c(x - 9) = -2(x + k)$ |
| 13 | Quartic in $x^2$ | Seen | $x^4 + 6ax^2 \ldots - 81$ |
| 15 | Altitude to the hypotenuse | Seen | Triangle XYZ, altitude from Y |
| 17 | Rational function from zeros | Seen | Zeros 2, 3, 7 |
| 19 | Data & statistics | Seen | Outlier changes the mean only |

**13 more types in the full Pack**

with what students reported for each

Broad types, not exact questions. A few were recalled by very few students.

# Part 3 · 8 new types Nov 7 added

## NEW Parallel lines + a range

**Why it's on the Dec 5 list:** The question students argued about most after Nov 7 (14+ reports, US forms). Angle facts plus a compound inequality. Not on most prediction lists, including ours.

**1** Student-produced response — BASE

Line $\ell$ is parallel to line $m$, and both are cut by a transversal. Two alternate interior angles formed by the transversal measure $(4x - 8)^\circ$ and $(2x + 20)^\circ$. What is the value of $4x - 8$?

**2** Multiple choice — HARD

Line $\ell$ is parallel to line $m$. A transversal meets $\ell$ at point $P$. A ray from $P$ splits an angle of measure $w^\circ$ into angles of measure $x^\circ$ and $y^\circ$, so $w = x + y$. An angle of measure $z^\circ$ at line $m$ satisfies $y + z = 180$. If $250 < w + z < 262$, which of the following could be the value of $x + 10$?

I. 80 II. 85

(A) I only
(B) II only
(C) I and II
(D) Neither I nor II

## NEW Triangle inequality

**Why it's on the Dec 5 list:** Reported on Nov 7 as "which can't be the third side". Quick if you know the rule, a time sink if you test every choice.

**3** Multiple choice — BASE

Two sides of a triangle have lengths 7 and 12. Which of the following could be the length of the third side?

A) 4
B) 5
C) 18
D) 19

**4** Multiple choice — HARD

The lengths of the sides of a triangle are $x$, $2x$, and 15. Which of the following could be the perimeter of the triangle?

A) 30
B) 45
C) 60
D) 63

## NEW Rectangle from 3 points

**Why it's on the Dec 5 list:** The last question of Module 1 on several Nov 7 forms (area 74 on one). Students who drew it on the grid finished fast.

**5** Student-produced response — BASE

Three vertices of a rectangle in the $xy$-plane are $(1, 2)$, $(7, 2)$, and $(7, 10)$. What is the area of the rectangle?

**6** Student-produced response — HARD

Three vertices of a rectangle in the $xy$-plane are $(0, 0)$, $(6, 3)$, and $(4, -8)$. What is the area of the rectangle?

# NEW A table of f(x) + k → y-intercept of f

**Why it's on the Dec 5 list:** The LAST question of Module 2 on both US and international Nov 7 forms. One Desmos regression solves it.

**7** Multiple choice **BASE**

For a linear function $f$, the table gives values of $f(x) + 3$.

| $x$ | $f(x) + 3$ |
|---|---|
| 1 | 8 |
| 2 | 11 |
| 3 | 14 |

What is the $y$-intercept of the graph of $y = f(x)$?

(A) $(0, -1)$

(B) $(0, 2)$

(C) $(0, 5)$

(D) $(0, 8)$

**8** Student-produced response **HARD**

For a quadratic function $f$, the table gives values of $f(x) - 4$.

| $x$ | $f(x) - 4$ |
|---|---|
| 1 | $-3$ |
| 2 | $-1$ |
| 3 | 3 |

What is the $y$-coordinate of the $y$-intercept of the graph of $y = f(x)$?

## NEW Perpendicular line through a point

**Why it's on the Dec 5 list:** Reported on Nov 7 in a "which point lies on it" style (answers like (4, 6 − 1/m)).

**9** Multiple choice — BASE

Line $\ell$ is defined by $y = 2x - 5$. Line $k$ is perpendicular to $\ell$ and passes through $(4, 1)$. Which point lies on line $k$?

A $(0, 1)$

B $(2, 2)$

C $(6, 1)$

D $(8, 3)$

**10** Student-produced response — HARD

Line $\ell$ passes through $(-2, 5)$ and $(4, 8)$. Line $k$ is perpendicular to $\ell$ and passes through $(3, 6)$. Line $k$ crosses the $x$-axis at $(a, 0)$. What is the value of $a$?

## NEW Ratio direction (sand : cement)

**Why it's on the Dec 5 list:** Students on Nov 7 argued whether 3:2 means 2s = 3c or 3s = 2c. Half of them wrote it backwards.

**11** Multiple choice — BASE

A concrete mix uses sand and cement in a ratio of $3 : 2$ by mass. If the mix uses $s$ kilograms of sand and $c$ kilograms of cement, which equation is true?

A $3s = 2c$

B $2s = 3c$

C $s + c = 5$

D $s = 3c$

**12** Student-produced response — HARD

A mix of sand and cement weighs 84 kilograms, with sand and cement in a ratio of $5 : 2$ by mass. How many kilograms of cement must be added so that the ratio of sand to cement becomes $5 : 3$?