

Paper SAT May 2023

Calculator Math (Section 4)

The 25 skills that carried the retired paper SAT calculator section — taught with 25 original SOMATH problems, built for the Digital SAT.

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How to use this deck

- One retired paper SAT Calculator section, one skill at a time. Twenty-five skills total.
- Every practice problem is written by SOMATH — no reprints of College Board content.
- The retired paper SAT is copyrighted. The current Digital SAT tests the same core skills.
- Every skill here also applies to the Digital SAT — where Desmos is available on every question.
- Grab the free printable worksheet at schoolofmath.us/posts/paper-sat-may-2023-calculator-math-25-original-problems
- Book a free Digital SAT evaluation at schoolofmath.us/evaluation — or come see us on the UWS.

Skill by skill

SKILL 1 OF 25

Line of best fit prediction

Substitute the given x into the line equation. Calc does the arithmetic.

ORIGINAL SOMATH PROBLEM

Line of best fit: $y = 0.008x + 4$. Predict y at $x = 3,700$.

Answer: $0.008 \cdot 3,700 + 4 = 33.6 \rightarrow 33$ (C).

SKILL 2 OF 25

Metric unit conversion (mg $\rightarrow$ g)

Bigger unit $\rightarrow$ smaller number. Divide by 1,000.

ORIGINAL SOMATH PROBLEM

Convert 4,200 milligrams to grams.

Answer: $4,200 / 1,000 = 4.2$ g (B).

Skill by skill

SKILL 3 OF 25

Y-intercept from two points

Find slope, then use $y = mx + b$ with either point.

ORIGINAL SOMATH PROBLEM

Line through $(-4, 3)$ and $(4, -1)$. Find the y-intercept.

Answer: Slope $-1/2 \rightarrow$ y-intercept $(0, 1)$ (C).

SKILL 4 OF 25

Density (per square unit)

Total $\div$ per-unit. Check the units on both sides.

ORIGINAL SOMATH PROBLEM

480 stomata per sq inch. A section has 1,320 stomata. Area?

Answer: $1,320 / 480 = 2.75$ sq in (C).

Skill by skill

SKILL 5 OF 25

Recognize decreasing exponential

Drops but flattens above the x-axis → exponential decay, not linear.

ORIGINAL SOMATH PROBLEM

**Curve drops fast, then levels off just above the x-axis without touching.
What kind of function?**

Answer: Decreasing exponential (D).

SKILL 6 OF 25

Median from a dot plot

Median of 9 values = 5th value in sorted order.

ORIGINAL SOMATH PROBLEM

Which 9-value distribution has median < 60?

Answer: 45, 45, 45, 50, 50, 55, 65, 70, 80 → median 50 (C).

Skill by skill

SKILL 7 OF 25

Metric-to-imperial conversion (ft → m)

1 m > 1 ft. Convert by dividing feet by 3.28.

ORIGINAL SOMATH PROBLEM

Tallest peak 14,500 ft. In meters?

Answer: $14,500 / 3.28 \approx 4,421$ m (B).

SKILL 8 OF 25

Percent greater than baseline

(new – old) / old × 100. Don't confuse with new / old.

ORIGINAL SOMATH PROBLEM

1,050 ft vs 700 ft. Percent greater?

Answer: $350 / 700 = 50\%$ (B).

Skill by skill

SKILL 9 OF 25

Compare medians of two lists

Median is a position, not a sum. Extreme values may not shift it.

ORIGINAL SOMATH PROBLEM

A = {3,5,7,7,9,13}, B = {3,5,7,7,9,13,28}. Compare medians.

Answer: Both medians = 7. Equal (C).

SKILL 10 OF 25

Mass-balance / density equation

Plug in known variables and solve for the unknown.

ORIGINAL SOMATH PROBLEM

$0.79x + 1.0y = 200$, $x = 150$. Find y .

Answer: $y = 200 - 118.5 = 81.5 \approx 82$ (B).

Skill by skill

SKILL 11 OF 25

Ratio-to-percent expression

Percent = $100 \cdot \text{part} / \text{whole}$.

ORIGINAL SOMATH PROBLEM

m of 500 members in favor. Percent expression?

Answer: $100(m/500)$ (A).

SKILL 12 OF 25

Equivalent equation (divide first)

Look for the shortcut: divide before distributing.

ORIGINAL SOMATH PROBLEM

$8(x + 40) = 40$. Which equation has the same solution?

Answer: Divide by 8: $x + 40 = 5$ (A).

Skill by skill

SKILL 13 OF 25

Read a value from a graph at a specific time

Locate the time on the x-axis and read up to the curve.

ORIGINAL SOMATH PROBLEM

Cooling curve: $90^{\circ}\text{C} \rightarrow 22^{\circ}\text{C}$. When is temperature closest to 40°C ?

Answer: Below the steep drop, above room temp $\rightarrow t \approx 5$ min (C).

SKILL 14 OF 25

Match linear model to correct-scale graph

Test the two endpoints. Right shape can still be wrong scale.

ORIGINAL SOMATH PROBLEM

$C(x) = 6.2x + 22$. Match the graph on $0 \leq x \leq 20$.

Answer: (0, 22) rising to (20, 146) (B).

Skill by skill

SKILL 15 OF 25

Interpret slope in a linear model

Slope = change per unit x . Watch the units on y .

ORIGINAL SOMATH PROBLEM

$P(x) = 3.2x + 47$ (population in thousands). What does 3.2 mean?

Answer: Population grows by 3,200 people per year (B).

SKILL 16 OF 25

Solve $R(x) = c$ (revenue target)

Set equal and divide. One-step.

ORIGINAL SOMATH PROBLEM

$R(x) = 5.50x$. Revenue \$2,750?

Answer: $x = 2,750 / 5.50 = 500$ bales (B).

Skill by skill

SKILL 17 OF 25

Profit inequality (revenue – cost $\geq k$)

Subtract cost from revenue first. Then apply the inequality.

ORIGINAL SOMATH PROBLEM

$R = 5.25x$, $C = 40,000 + 1.25x$. Profit $\geq \$12,000$?

Answer: $12,000 \leq 4x - 40,000$ (A).

SKILL 18 OF 25

Expand and simplify polynomials

Perfect square + difference of squares. Add the results.

ORIGINAL SOMATH PROBLEM

$(x^2 + 5)^2 + (x - 3)(x + 3) = ?$

Answer: $x^4 + 10x^2 + 25 + x^2 - 9 = x^4 + 11x^2 + 16$ (C).

Skill by skill

SKILL 19 OF 25

Parallel-line system

Same slope, different intercepts $\rightarrow$ zero solutions.

ORIGINAL SOMATH PROBLEM

$y = 3x + 2$ and $y = 3x + 8$. Solutions?

Answer: Zero (A).

SKILL 20 OF 25

Solve $h(x) > 0$ for a linear function

"Above the x-axis" = $y > 0$. Solve the inequality.

ORIGINAL SOMATH PROBLEM

$h(x) = 2x + 6$. Where is graph above x-axis?

Answer: $2x + 6 > 0 \rightarrow x > -3$ (B).

Skill by skill

SKILL 21 OF 25

Half-life at a specific time

Each half-life multiplies by $1/2$. Count how many fit.

ORIGINAL SOMATH PROBLEM

I-131, half-life 8 days. After 24 days from 8 ng, what remains?

Answer: $24 = 3 \text{ half-lives} \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1 \text{ ng (B)}$.

SKILL 22 OF 25

Quadratic with no real solutions

Discriminant $b^2 - 4ac < 0 \rightarrow$ no real solutions.

ORIGINAL SOMATH PROBLEM

Which has no real solutions: $2x^2 - 4=0$, $2x^2 + 4x=0$, $2x^2 + 4x + 5=0$, $2x^2 - 6x + 4=0$?

Answer: $2x^2 + 4x + 5=0$: $D = 16 - 40 = -24 < 0$ (C).

Skill by skill

SKILL 23 OF 25

Cofunction identity

$\sin(90^\circ - x) = \cos x$, and $\cos(90^\circ - x) = \sin x$.

ORIGINAL SOMATH PROBLEM

Right triangle 20-21-29, x opposite the leg of 20. Which is NOT true?

Answer: $\sin(90^\circ - x) = 21/29$, not $20/29$ (B).

SKILL 24 OF 25

Percent-greater-than over years

"p% greater than X" = $X(1 + p/100)$. Never $X \cdot p/100$.

ORIGINAL SOMATH PROBLEM

500 eagles → 260% greater. New count?

Answer: $500 \cdot 3.6 = 1,800$ (B).

Skill by skill

SKILL 25 OF 25

Symmetry of a parabola

x-intercepts are equidistant from the vertex's x-coordinate.

ORIGINAL SOMATH PROBLEM

Vertex $(4, -9)$, one x-intercept $(1, 0)$. Other x-intercept?

Answer: 1 is 3 left of 4 $\rightarrow$ other is 3 right = 7. $(7, 0)$ (B).

Bridge to the Digital SAT

- The Digital SAT gives Desmos on every math question — so every one of these 25 skills is fair game, and calculator fluency matters more.
- Scoring is adaptive: Module 1 places you, Module 2 sets your ceiling. Miss data-read and percent skills early and Module 2 caps low.
- Length changed (98 → 44 math questions). Pacing pressure and topic coverage did not.
- Use these 25 problems as a diagnostic. If more than 4 feel slow, that's your Digital SAT prep shortlist.
- Next steps: schoolofmath.us/posts/digital-sat-tutoring-nyc-2026-structure-dates-scores · schoolofmath.us/courses/digital-sat

Book a free 30-minute SAT evaluation.

We'll test the 25 skills above and any Digital SAT gaps.
You leave with a written prep plan — no obligation.

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