



Math Tutoring AI

SAT Math Workbook

Complete Study Guide • Visual Lessons • Practice • Strategy

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Chapter 1 — Introduction to SAT Math

Overview of SAT Math domains, scoring, calculator vs. no-calculator sections, and strategic overview.

Chapter 2 — SAT Math Structure & Timing

Breakdown of question types, pacing tips, and common traps unique to SAT Math.

Chapter 3 — Algebra & Linear Equations

Linear equations, systems, slopes, linear models, isolating variables, and interpreting linear functions.

Chapter 4 — Advanced Math

Quadratic equations, completing the square, polynomial structure, rational expressions, and radicals.

Chapter 5 — Problem Solving & Data Analysis

Ratios, proportions, percentages, units, scatterplots, two-way tables, and basic statistics.

Chapter 6 — Geometry & Trigonometry

Triangles, circles, volume, right triangle trig, SOH-CAH-TOA, and geometry in coordinate plane.

Formula Sheets (Summary)

Includes critical SAT formulas for algebra, advanced math, trigonometry, and data analysis.

Practice Sets & Mixed Review

Topic-based practice sets and combined review sets are available as separate downloadable PDFs.

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SAT Math Formula Sheets

Algebra

Formula	Expression
Slope	$(y_2 - y_1) / (x_2 - x_1)$
Linear Equation	$y = mx + b$
Systems	Solve by substitution or elimination
Quadratic Formula	$x = [-b \pm \sqrt{b^2 - 4ac}] / (2a)$

Advanced Math

Formula	Expression
Polynomial Degree	highest exponent
Factoring	$a^2 - b^2 = (a - b)(a + b)$
Rational Expressions	$(a/b) / (c/d) = ad/bc$
Exponent Rules	$a^m a^n = a^{(m+n)}$

Data Analysis

Formula	Expression
Mean	sum / n
Median	middle value
Mode	most frequent
Two-way Tables	use row/column totals

Geometry & Trig

Formula	Expression
Area Circle	πr^2
Volume Cylinder	$\pi r^2 h$
SOH-CAH-TOA	$\sin = \text{opp/hyp}, \cos = \text{adj/hyp}, \tan = \text{opp/adj}$

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SAT Math – Full-Length Practice Test (44 Questions)

1. If $3x - 7 = 20$, what is x ?
2. A line has slope 4 and passes through $(2,3)$. What is its equation?
3. What is the value of $(x^2 - 16) / (x - 4)$, $x \neq 4$?
4. If $f(x)=2x^2-3$, what is $f(5)$?
5. Solve: $|x - 2| = 9$.
6. A quantity increases from 40 to 50. What is the percent increase?
7. What is the solution to $5x + 2 = 3x - 10$?
8. A right triangle has legs 9 and 12. Find the hypotenuse.
9. Convert 4.2×10^3 to standard form.
10. A scatterplot has a positive linear association. Which is true?
11. A system of equations: $x + y = 12$ and $x - y = 4$. What is x ?
12. Simplify: $\sqrt{75}$.
13. A cylinder has radius 3 and height 10. Find its volume.
14. If $(x - 1)(x + 7) = 0$, what are the solutions?
15. Solve: $4^{(x+1)} = 64$.
16. What is the slope of the line through $(5,-1)$ and $(9,7)$?
17. $f(x)=3x-8$. What is $f(-2)$?

18. The mean of five numbers is 18. Four numbers are 10, 20, 19, and 25. Find the fifth.
19. A linear function increases by 3 every step. What is its slope?
20. A circle has diameter 14. What is its area?
21. Solve: $x^2 - 10x + 16 = 0$.
22. If 30% of a number is 45, find the number.
23. A data set has values 3, 7, 9, 15. What is the median?
24. Convert 0.0063 to scientific notation.
25. What is $7/12$ as a decimal?
26. Solve: $2x - 5 \leq 11$.
27. A car travels 180 miles in 3 hours. Find its speed.
28. A sequence has first term 4 and common difference 5. What is term 12?
29. Simplify: $(3x^3)(2x^2)$.
30. A triangle has sides 8,15,17. Is it right?
31. Solve: $(x/3) + 4 = 10$.
32. A rectangle has perimeter 50 and length 12. Find the width.
33. What is the value of $\sqrt{49/9}$?
34. A box holds 10 red, 5 blue, 5 green marbles. Probability of blue?
35. Factor: $x^2 - 9x + 20$.
36. Solve: $2^x = 32$.
37. What is the y-intercept of $y = -3x + 14$?
38. A polygon has interior angle sum 1800° . How many sides?
39. Midpoint between $(-4,10)$ and $(8,2)$?

40. If $\sin\theta = 5/13$, what is $\cos\theta$?

41. A line has slope -2 . A perpendicular line has slope?

42. Solve: $\sqrt{x + 4} = 9$.

43. If $f(x) = x^2 - 6x + 5$, what is $f(7)$?

44. What is the range of $\{2, 7, 4, 9, 15\}$?

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SAT Math – Full-Length Practice Test Answer Key and Explanations

1. $x=9$. $3x-7=20 \rightarrow 3x=27$.
2. $y-3=4(x-2) \rightarrow y=4x-5$.
3. $x+4$ (difference of squares).
4. $2(25)-3=47$.
5. $x=11$ or $x=-7$.
6. Increase = $10/40 = 25\%$.
7. $5x+2=3x-10 \rightarrow 2x=-12 \rightarrow x=-6$.
8. Hypotenuse = 15.
9. 4200.
10. As x increases, y increases.
11. Add equations $\rightarrow 2x=16 \rightarrow x=8$.
12. $\sqrt{75}=5\sqrt{3}$.
13. $\pi r^2 h = 90\pi$.
14. $x=1$ or $x=-7$.
15. $4^{x+1}=64=4^3 \rightarrow x+1=3 \rightarrow x=2$.
16. Slope = $(7+1)/(9-5)=2$.
17. $f(-2)=-6-8=-14$.

18. $\text{Total}=90 \rightarrow \text{fifth}=26.$

19. $\text{Slope}=3.$

20. $\text{Area}=\pi(7)^2=49\pi.$

21. $\text{Roots: } 2 \text{ and } 8.$

22. $x=150.$

23. $\text{Median}=(7+9)/2=8.$

24. $6.3 \times 10^3.$

25. $0.5833\dots$

26. $2x \leq 16 \rightarrow x \leq 8.$

27. $\text{Speed}=60 \text{ mph}.$

28. $a=4, d=5 \rightarrow a_{11}=4+11 \cdot 5=59.$

29. $6x.$

30. $\text{Yes, } 8^2+15^2=17^2.$

31. $x=18.$

32. $2L+2W=50 \rightarrow W=13.$

33. $7/3.$

34. $P(\text{blue})=5/20=1/4.$

35. $(x-5)(x-4).$

36. $32=2^x \rightarrow x=5.$

37. $y\text{-intercept}=14.$

38. $(n-2)180=1800 \rightarrow n=12.$

39. $((-4+8)/2, (10+2)/2) = (2,6).$

40. $\cos\theta=12/13$.

41. Perpendicular slope = $1/2$.

42. $x+4=81 \rightarrow x=77$.

43. $49-42+5=12$.

44. Range= $15-2=13$.

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