

MASTER THE SAT MATH

Problem Solving & Data Analysis Workbook

*Digital SAT · Statistics · Probability · Percentages
Graphs · Unit Conversion · Sampling · Practice
Questions*

Honest Earning
2026

How to Use This Book

Section	What You'll Get
Chapters 1–7: Core Content	Conceptual mastery with diagrams, examples, and visual frameworks
Callout Boxes (Key/Formula/Trap/Tip)	Fast-reference rules and common SAT pitfalls highlighted throughout
Practice Exercises	Short skill-checks at the end of each major topic section
Chapter Mini-Quizzes	5–8 difficulty-labeled questions after every chapter
Chapter 8: Strategy Guide	Desmos shortcuts, time management, and elimination techniques
Chapter 9: Full Practice Set	25 questions spanning all topics with step-by-step solutions
Quick Reference Card (Appendix)	One-page formula and rule summary — print and keep at your desk

KEY CONCEPT: *This book is designed to be worked cover to cover on a first pass. Each chapter builds on the previous one. If you are short on time, use the Table of Contents to jump directly to weak areas.*

Introduction: The Section That Can Change Your Score

"In God we trust; all others must bring data." — W. Edwards Deming

Picture two students sitting in the same testing room, both staring at the same scatter plot question. The first student reads it three times, reaches for the calculator, starts typing in numbers, runs out of time, and guesses. The second student glances at the graph, recognizes the pattern in under ten seconds, marks the answer, and moves on.

Same question. Wildly different outcomes. The difference between those two students is not intelligence it is pattern recognition built through deliberate preparation.

Problem Solving and Data Analysis represents approximately 13–14% of your total SAT Math score—roughly 100 points on an 800-point scale. More importantly, it is one of the most learnable sections on the entire test. The College Board recycles a small, predictable set of question patterns. Once you can identify them on sight and apply the right framework automatically, this section becomes one of your most reliable sources of correct answers.

What This Book Covers

Chapter	Topic	% of SAT Data Questions
1	One-Variable Statistics: mean, median, SD, range	~25%
2	Data Displays: 5 graph types mastered	~20%
3	Two-Variable Data: scatter plots, trends	~18%
4	Unit Conversion: fraction-stacking method	~12%
5	Percentages: the #1 error generator	~10%
6	Probability: target over total	~8%
7	Sampling, Margin of Error, Causation	~7%
8–9	Strategy + Full Practice Set	—

By the final page of this book, you will have the conceptual foundation, visual pattern recognition, and practice repetition to approach every question in this section with confidence. Let us begin.

Chapter 1: One-Variable Statistics

Mean · Median · Mode · Range · Standard Deviation

One-variable data questions are built on seven statistics. Learn to compute them, visualize them, and crucially predict their relationship from a graph shape without touching a calculator. That last skill separates the 700-scorer from the 800-scorer.

1.1 The Mean: Balance Point of Data

FORMULA: $\text{Mean} = (\text{Sum of all values}) \div (\text{Number of values})$

Example: Data set {2, 1, 4, 6, 7, 9, 2}. Sum = 31. Count = 7. Mean = $31 \div 7 \approx 4.43$.

But here is the conceptual leap that saves time on every graph question: think of the mean as a physical balance point. Imagine placing the distribution on a seesaw—the mean is the exact fulcrum where it balances perfectly. This lets you estimate the mean from any graph shape in seconds.

QUICK TIP: *Desmos shortcut: Store your list once as $A = [2,1,4,6,7,9,2]$, then call $\text{mean}(A)$, $\text{median}(A)$, $\text{stdev}(A)$ — no retyping needed.*

1.2 The Median: The Outlier-Proof Centre

KEY CONCEPT: *The median is the middle value when data is sorted. It resists the pull of outliers—the mean does not.*

Finding the median step-by-step:

1. Sort all values from smallest to largest.
2. If the count is ODD: the median is the exact middle value.
3. If the count is EVEN: average the two middle values.

Example (7 values, odd): $\{1, 2, 2, 4, 6, 7, 9\}$ cross from both ends inward median = 4.

Example (6 values, even): $\{1, 2, 4, 6, 7, 9\}$ two middle values are 4 and 6 median = $(4+6) \div 2 = 5$.

1.3 Mean vs. Median: Reading Skew From a Graph

This is the single most tested one-variable concept on the SAT. You must be able to look at a histogram and instantly know which measure is larger without computing either one.

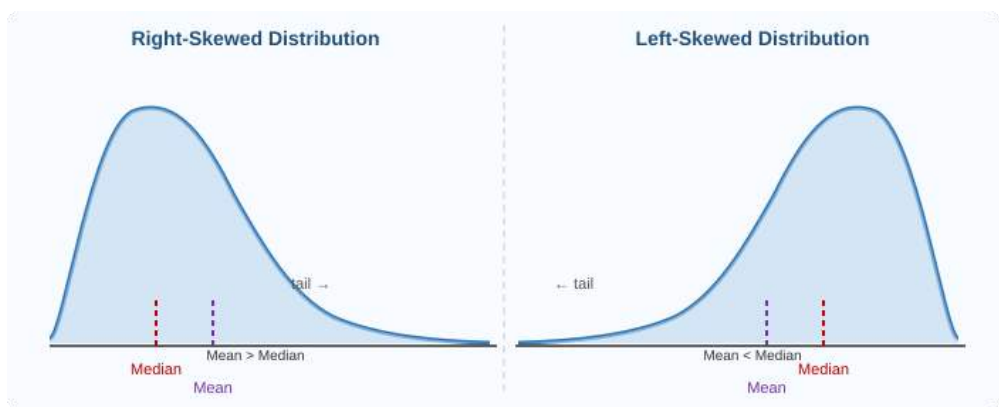


Figure 1.1 — Right-skewed vs. left-skewed distributions showing mean/median positions

Distribution Shape	Tail Direction	Mean vs. Median
Right-skewed (positive skew)	Right (toward higher values)	Mean > Median
Left-skewed (negative skew)	← Left (toward lower values)	Mean < Median
Symmetric (bell-shaped)	No dominant tail	Mean $\approx$ Median

SAT TRAP: *The mean is ALWAYS pulled toward the tail—toward the unusual values. The median stays near the bulk of the data. If you see a long right tail, the mean is to the right of the median, period.*

1.4 Mode: The Most Common Value

Mode = the value that appears most frequently. A data set can have one mode (unimodal), two modes (bimodal), or no mode (all values appear equally often). Mode is the least-tested of the three centre measures but you must be able to identify it if asked.

EXAMPLE: *Data set: {3, 5, 5, 7, 8, 8, 8, 10}. The mode is 8 (appears 3 times, more than any other value).*

1.5 Minimum, Maximum, and Range

FORMULA: *Range = Maximum – Minimum*

The range tells you the total spread of the data. It is easy to calculate but has one major weakness: a single extreme outlier can make the range enormous while all other data points are tightly clustered together.

EXAMPLE: Data: $\{5, 6, 6, 7, 7, 7, 8, 100\}$.
Range = $100 - 5 = 95$. But 7 of the 8 values
span only 3 units. The range is misleading
here.

1.6 Standard Deviation: Visual Comparison Only

KEY CONCEPT: Standard deviation (SD) measures how spread-out data is from the mean. Higher SD = more spread = more variation. Lower SD = more clustered = less variation. You will NEVER need to compute SD on the SAT—only compare it visually.

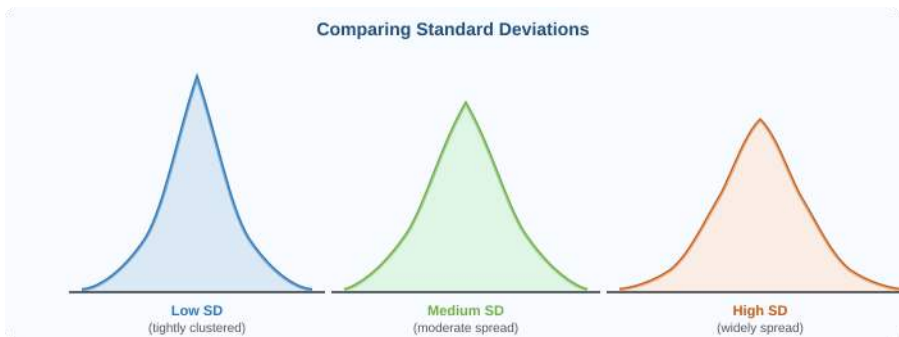


Figure 1.2 — Three distributions showing low, medium, and high standard deviation

The visual rule: imagine the graph as a tent. A tall, narrow tent has low SD. A short, wide tent has high SD. A flat pancake has very high SD. Two-humped

(bimodal) shapes have very high SD because data clusters far from the mean.

QUICK TIP: *When comparing two distributions, ask: 'Which one looks more spread out?' That one has the higher SD. You do not need any numbers.*

1.7 Transformation Rules — A Guaranteed Question Type

The SAT repeatedly asks: 'If every value in a data set is [added to / multiplied by] a constant, what happens to these statistics?' The answer follows two iron-clad rules:

Transformation	Effect on Statistics
Add or subtract a constant k to every value	Mean, median, mode shift by k Range and SD are UNCHANGED
Multiply or divide every value by a constant k	Mean, median, mode multiply by k Range and SD also multiply by k