



FORMULA SHEET · HIGH SCHOOL

Digital SAT Math Formulas and Strategies

The Digital SAT gives you a short reference sheet. This sheet adds the formulas it leaves out, the test format, and the strategies our tutors teach for the two Math modules.

SAT

01 The test format

Math – two modules of 22 questions, 35 minutes each (44 questions, 70 minutes)

Reading and Writing – two modules of 27 questions, 32 minutes each

Adaptive – the second module's difficulty depends on how you did in the first

Calculator – allowed throughout, with the Desmos graphing calculator built in

Answers – most are multiple choice; about a quarter are student-produced responses

Scores – 400 to 1600 in total; check the College Board site for the current rules

02 On the reference sheet

Areas – circle πr^2 ; rectangle lw ; triangle $\frac{1}{2}bh$

Circumference – $2\pi r$

Pythagoras – $a^2 + b^2 = c^2$

Special right triangles – 30-60-90 has sides $x, x\sqrt{3}, 2x$; 45-45-90 has sides $s, s, s\sqrt{2}$

Volumes – box lwh ; cylinder $\pi r^2 h$; sphere $(4/3)\pi r^3$; cone $\frac{1}{3}\pi r^2 h$; pyramid $\frac{1}{3}lwh$

Angles – 360° (2π radians) in a circle; 180° in a triangle

03 Not on the sheet: memorise

Slope – $m = (y_2 - y_1)/(x_2 - x_1)$; $y = mx + b$; $y - y_1 = m(x - x_1)$

Parallel and perpendicular – equal slopes; slopes multiply to -1

Quadratics – $x = [-b \pm \sqrt{b^2 - 4ac}]/2a$; vertex at $x = -b/2a$; vertex form $y = a(x - h)^2 + k$

Discriminant – $b^2 - 4ac > 0$ two real solutions, $= 0$ one, < 0 none

Factoring – $a^2 - b^2 = (a + b)(a - b)$; $(a \pm b)^2 = a^2 \pm 2ab + b^2$

Exponents – $a^m a^n = a^{m+n}$; $(a^m)^n = a^{mn}$; $a^{-n} = 1/a^n$; $a^{1/n} = \text{nth root of } a$

Growth and decay – $y = a(1 + r)^t$; $y = a(1 - r)^t$

Percent change – $(\text{new} - \text{old})/\text{old} \times 100$

Circle – $(x - h)^2 + (y - k)^2 = r^2$; complete the square to find the centre

Arcs and sectors – arc $= (\theta/360) \cdot 2\pi r$; sector $= (\theta/360) \cdot \pi r^2$; radians $= \text{degrees} \times \pi/180$

Trigonometry – SOH-CAH-TOA; $\sin x^\circ = \cos(90 - x)^\circ$

Systems – no solution when the lines are parallel; infinitely many when they are the same line

Statistics – mean, median, mode, range; standard deviation measures spread; probability $= \text{favourable}/\text{total}$

04 Strategies that save time

Use Desmos – graph both sides of an equation and read the intersection

Backsolve – try the answer choices in the equation, starting with the middle value

Pick numbers – replace variables with easy numbers and test each choice

Read the last line first – know exactly what is being asked before you calculate

Flag and move – no question is worth more than another; come back to hard ones

How to use this sheet

- 1 Practise on the official Bluebook app so the interface feels familiar.
- 2 Keep an error log: topic, why you missed it, and the fix.
- 3 Time yourself per module, not per question.

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CHEAT SHEET · HIGH SCHOOL

SAT Reading and Writing Grammar Rules

Standard English Conventions questions test a small set of rules again and again. Learn these and the grammar questions become the fastest marks on the Reading and Writing section.

SAT

English

01 Joining sentences

Two complete sentences – join with a period, a semicolon, or a comma plus FANBOYS (for, and, nor, but, or, yet, so)

Comma splice – two complete sentences joined by a comma alone is always wrong

Colon – comes after a complete sentence and introduces an explanation, list or example

Dashes – a pair of dashes works like a pair of commas around extra information

02 Commas

Non-essential information – put commas on both sides of a phrase you could delete

Subject and verb – never put a single comma between them

Restrictive clauses – no comma before 'that' when it defines the noun

Lists – commas between items; a final (Oxford) comma is acceptable

03 Agreement

Subject-verb – find the real subject: 'The list of items is long' (list is singular)

Singular words – each, every, either, neither, everyone take singular verbs

Collective nouns – team, committee, company usually take singular verbs and 'its'

Pronoun-antecedent – the pronoun must match the noun it replaces in number

04 Common confusions

its / it's – its = belonging to it; it's = it is

their / there / they're – possession / place / they are

who / whom – who does the action (subject); whom receives it (object)

Possessives – student's (one student); students' (more than one)

05 Sentence sense

Modifiers – the noun right after an introductory phrase must be the one doing the action

Verb tense – keep tense consistent unless the time actually changes

Parallel structure – items in a list or comparison take the same form

06 Transitions

Contrast – however, nevertheless, by contrast, still

Cause and effect – therefore, consequently, thus, as a result

Addition – moreover, furthermore, in addition, similarly

Example – for example, for instance

Sequence – subsequently, finally, meanwhile

07 The four content areas

Craft and Structure – words in context, text structure and purpose, cross-text connections

Information and Ideas – central ideas, command of evidence (textual and quantitative), inferences

Standard English Conventions – boundaries, form, structure and sense

Expression of Ideas – rhetorical synthesis from notes, and transitions

How to use this sheet

- 1 For rhetorical synthesis questions, re-read the goal and pick the option that meets only that goal.
- 2 When two answers look right, choose the shorter one that is grammatically complete.
- 3 Read the sentence before and after a transition blank before choosing.

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