Digital SAT · Math

2 pages · CertStud
44 Q · 70 min · calculator + Desmos always on

Format & domains

- **Module 1:** 22 Q / 35 min
- **Module 2:** 22 Q / 35 min (adaptive)
- ~1.6 min/Q · multiple choice + student-produced response (SPR)
- **Algebra ~35%** · **Advanced Math ~35%**
- **PSDA ~15%** · **Geometry/Trig ~15%**
- Official reference sheet available — still memorize these for speed

Always-on tactics

- **Backsolve:** plug choices into the equation (start mid-size)
- **Pick numbers:** for abstract %, variables, "in terms of"
- **Desmos:** graph both sides; intersections, vertices, zeros
- **Draw** unlabeled geometry; mark knowns on the figure
- Translate words → equation before

High-frequency traps

- Finding x when asked for 2x, x+3, or xy
- Radius vs diameter; area vs circumference
- % of vs % change; of = × ; change = (new−old)/old
- No solution = parallel lines; infinite = same line
- Forgetting to flip inequality when ×/÷

Algebra (Heart of Algebra)

Idea	Formula / note
Slope	$m = (y_2-y_1)/(x_2-x_1)$ · rate of change · rise/run
Slope-intercept	$y = mx + b$ · b = y-intercept / starting value
Point-slope	$y - y_1 = m(x - x_1)$
Standard form	$Ax + By = C$ · intercepts: x→(C/A,0), y→(0,C/B)
Parallel	same m, different b
Perpendicular	slopes negative reciprocals · $m_1 \cdot m_2 = -1$
Systems	substitution / elimination / graph · solution = intersection
No / infinite sol.	parallel (same m, ≠ b) · identical line (same m and b)
Inequalities	flip when ×/÷ by negative; open/closed circle; shade correctly
Absolute value	$\lvert x-a\rvert=b$ → x=a±b (if b≥0); inequalities split into

Advanced Math (Passport to Advanced Math)

Idea	Formula / note
Quadratic	$ax^2 + bx + c = 0$
Quadratic formula	$x = (-b \pm \sqrt{(b^2-4ac)}) / 2a$
Discriminant	$\Delta = b^2-4ac$ · >0 two real · =0 one · <0 none real
Vertex form	$y = a(x-h)^2 + k$ · vertex (h,k); a>0 opens up
Factored form	$y = a(x-r)(x-s)$ · zeros at r, s
Axis of symmetry	$x = -b/(2a)$ · also midpoint of roots
Sum / product of roots	$-b/a$ · c/a
Completing the square	Move c; add (b/2a)² to both sides → vertex form
Difference of squares	$a^2-b^2 = (a+b)(a-b)$
Perfect square	$(a\pm b)^2 = a^2 \pm 2ab + b^2$

Factoring & equivalent expressions (speed drills)

- GCF first, then trinomial / grouping
- $x^2 + (p+q)x + pq = (x+p)(x+q)$
- ax^2+bx+c: find factors of ac that sum to b
- Match coefficients after expanding to find unknowns
- Rational expressions: factor → cancel common factors (note excluded values)
- Polynomial ops: combine like terms; FOIL binomials
- If stuck: Desmos both expressions — identical graphs ⇒ equivalent

PSDA + Geo/Trig + calculator power moves

Geometry · Data · Desmos · Grid-ins

Geometry & trigonometry

Area / volume / circles

- Triangle $A = \frac{1}{2}bh$ · angles sum 180°
- Rectangle lw · trapezoid $\frac{1}{2}(b_1+b_2)h$
- Circle $A = \pi r^2$ · $C = 2\pi r$
- Arc length $(\theta/360)\cdot 2\pi r$
- Sector area $(\theta/360)\cdot \pi r^2$
- Rectangular prism $V = lwh$
- Cylinder $V = \pi r^2 h$
- Sphere $V = 4/3\ \pi r^3$ · $SA = 4\pi r^2$
- Cone $V = 1/3\ \pi r^2 h$

Triangles & coordinate

- Pythagorean $a^2 + b^2 = c^2$
- Common triples: 3-4-5, 5-12-13, 6-8-10, 7-24-25
- 45-45-90 → $x : x : x\sqrt{2}$
- 30-60-90 → $x : x\sqrt{3} : 2x$
- Similar Δ → corresponding sides proportional; angles equal
- Distance $\sqrt{[(x_2-x_1)^2+(y_2-y_1)^2]}$
- Midpoint $((x_1+x_2)/2, (y_1+y_2)/2)$
- SOH-CAH-TOA · $\sin^2\theta + \cos^2\theta = 1$
- $\sin\theta = \cos(90°-\theta)$

Problem solving & data analysis (PSDA)

Topic	Remember
Ratio / proportion	$a/b = c/d$ → ad = bc · keep units aligned
Unit rates	Divide carefully; cancel units (mi/h, $/lb, people/room)
Percent	part = % × whole · % = part/whole × 100
Percent change	$(new-old)/old \times 100\%$ · increase vs decrease
Successive %	Multiply factors: ×1.08 then ×0.95 ≠ net –3% always check
Mean / median / mode	avg · middle when ordered · most frequent
Weighted average	Σ(value×weight) / Σ weights
Range / outliers	max–min; outliers pull mean more than median
Probability	favorable/total · independent: multiply · P(A or B)=P(A)+P(B) if disjoint

Desmos power moves (built-in calculator)

- Graph $y=…$ and $y=…$ to solve systems / intersections visually
- Click points for intercepts, vertices, zeros — read exact or approximate values
- Table mode: generate values for sequences or test several x quickly
- Inequalities: shade regions to check which option matches constraints
- Regression / best fit when a scatter is given as points you can enter
- For “which is equivalent?”: graph candidate expressions — overlap ⇒ match
- Don’t over-rely: clean integers → mental math is faster and

Student-produced response (grid-in)

- Answers are positive unless the question allows negative (Digital SAT SPR can be negative — follow on-screen rules)
- Fractions OK (e.g. 7/2); decimals OK (3.5); don’t grid mixed numbers (use 7/2 not 3 1/2)
- Reduce only if needed for uniqueness — equivalent forms usually accepted if correctly entered
- If multiple answers work, enter one valid value
- Round only when the question says to; otherwise enter exact
- Re-enter carefully — one wrong digit wastes an otherwise correct solve

Word-problem skeletons

- **Percent of percent:** 20% of 30% of N = 0.2×0.3×N
- **Interest / growth:** $A = P(1+r)^t$
- **Work rates:** $1/t_1 + 1/t_2 = 1/t\_together$
- **Average speed:** total distance / total time (not average of speeds)
- **Linear model:** identify slope (rate) and intercept (start) from a table/story
- **Inequality stories:** “at least / at most / no more than” → ≥ ≤

Last 60 seconds before submit

- ☐ No blanks — guess after eliminating impossibles
- ☐ Re-read what was asked (expression vs value vs units)
- ☐ Flagged: plug choice back into original equation
- ☐ Check SPR entry format one more time
- ☐ Hard Module 2 means strong Module 1 — stay calm and systematic
- ☐ If two choices left, estimate / graph / pick numbers to break the tie