



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  $\pi r^2$ ; 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** –  $360^\circ$  ( $2\pi$  radians) in a circle;  $180^\circ$  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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