Algebra 2 syllabus: the ten units as a checklist

The commonest order in US schools (and the one the Regents Algebra II course follows). Tick a unit when every skill in it is automatic, not merely understood: Algebra 2 uses each unit inside the next one.

Unit	Skills to tick	Assumes	Weeks
1. Functions and transformations	[ ] notation, domain, range [ ] parent functions [ ] shifts, reflections, stretches as changes to the equation [ ] piecewise [ ] inverses and compositions [ ] 3-variable systems	Alg 1 units 4, 9	3-4
2. Quadratics and complex numbers	[ ] completing the square, vertex form [ ] formula and discriminant [ ] i and complex arithmetic [ ] complex roots [ ] quadratic inequalities [ ] line-parabola systems	Alg 1 unit 9	3
3. Polynomial functions	[ ] operations [ ] end behaviour by degree [ ] remainder and factor theorems [ ] synthetic and long division [ ] zeros and multiplicity [ ] graph from factored form	units 1, 2; factoring	4
4. Radicals and rational exponents	[ ] rational exponents and laws [ ] simplify radicals of any index [ ] graph root functions [ ] solve radical equations, check for extraneous roots	Alg 1 unit 10	2-3
5. Exponentials and logarithms	[ ] growth, decay, compound interest, e [ ] log as the inverse [ ] laws of logs, change of base [ ] solve both kinds of equation [ ] half-life and doubling time	Alg 1 unit 6; unit 1	4
6. Rational functions	[ ] simplify, multiply, divide, add, subtract [ ] asymptotes and holes [ ] solve rational equations [ ] inverse and joint variation	unit 3	3
7. Sequences and series	[ ] arithmetic and geometric, explicit and recursive [ ] sigma notation [ ] finite sums [ ] infinite geometric sum	Alg 1 unit 10	2
8. Trigonometric functions	[ ] radians [ ] unit circle at the special angles [ ] graphs: amplitude, period, phase shift, midline [ ] Pythagorean, reciprocal, quotient identities [ ] simple equations	right-triangle trig	3-4
9. Probability and statistics	[ ] conditional probability, two-way tables [ ] permutations and combinations [ ] binomial setting [ ] normal distribution and z-scores [ ] sampling, margin of error, simulation	Alg 1 unit 11	3
10. Conics and matrices (some schools)	[ ] circles, parabolas, ellipses, hyperbolas [ ] matrix operations and inverses	unit 2	0-2

First semester is usually units 1 to 5, second semester 6 to 9 or 10. New York's Regents Algebra II has everything except conics and matrices; Texas's TEKS include conics and matrices and less statistics.

What the SAT tests from Algebra 2 (Advanced Math, about 35% of the section)

[ ] Quadratics in every form; polynomial factoring and division; exponential functions and equations

[ ] Radicals and rational exponents; rational expressions; systems with one non-linear equation; function notation and transformations

[ ] NOT tested: logarithms, trigonometric functions, sequences and series, the normal distribution. Finish unit 5 by February and the whole SAT domain is covered before the spring test

From sciencewithshobha.com/blog/algebra-2-syllabus-every-unit-in-order-what-the-sat-and-regents-test-and-where-the-course-is-lost/ · 1-on-1 online maths, Grades 3 to 12, free 30-minute first class.

Where the course is lost, the readiness check, and CBSE Class 11

Lost at	What goes wrong	The fix
Transformations (unit 1)	learned as parabola rules, met again as a mystery in units 4, 5, 6, 8	understand f(x - 3) + 2 as a property of every function, in September
Logarithms (unit 5)	straight to the laws	rewrite log2 8 = 3 as 2^3 = 8 fifty times, both directions, before any law
Factoring (unit 3)	Algebra 1 factoring was never automatic	twenty minutes a day for three weeks before unit 3
The unit circle (unit 8)	a table of 48 facts, forgotten by the exam	build it from the two special triangles in a minute

Readiness check from Algebra 1 and Geometry (no calculator)

1. Factor $x^2 - 5x - 14$.
2. Factor $2x^2 + 7x + 3$.
3. Solve $x^2 - 6x + 2 = 0$ exactly.
4. Vertex form of $y = x^2 + 4x + 1$.
5. Simplify root 72.
6. Simplify $(x^3)^4 \cdot x^{-2}$.
7. If $f(x) = 2x^2 - 3$, find $f(-2)$.
8. Solve $y = x^2$ and $y = 2x + 3$.
9. Simplify $(x^2 - 9)/(x^2 + 5x + 6)$.
10. Slope of a line perpendicular to $y = (2/3)x - 1$.
11. Legs 5 and 12: sin of the angle opposite the side 5.
12. 500 grows 8% a year: write P(t).

Answers

1. $(x - 7)(x + 2)$. 2. $(2x + 1)(x + 3)$. 3. $x = 3 \pm$ root 7. 4. $y = (x + 2)^2 - 3$. 5. 6 root 2. 6. x^{10}. 7. 5. 8. (3, 9) and (-1, 1). 9. $(x - 3)/(x + 2)$. 10. -3/2. 11. 5/13. 12. $P(t) = 500(1.08)^t$. Ten or more: ready. Seven to nine: ready, with the missed topics as September's warm-ups. Fewer than seven: a month on Algebra 1 factoring, quadratics and function notation first.

Algebra 2 against CBSE Class 11

Unit	CBSE	The student from India is
Functions, transformations	Class 11, no transformations	behind on transformations, inverses, piecewise
Quadratics, complex	Class 10, 11	ahead
Polynomials	Class 9, 10	ahead on algebra; behind on graphing
Radicals	Class 9 surds	ahead on simplifying; behind on graphs
Exponentials, logs	varies; often not in CBSE school maths	laws known; functions and modelling new
Rational functions	not as a topic	behind on asymptotes
Sequences	Class 10, 11	ahead
Trig functions	Class 10, 11	ahead, by a wide margin
Probability, statistics	Class 10, 11, 12	ahead on probability; behind on the normal distribution and sampling
Conics, matrices	Class 11, 12	ahead