

AP STEM Formula and Strategy Guide

A one-page-per-course survey across all eight AP STEM subjects: Precalculus, Calculus AB/BC, Statistics, Biology, Chemistry, Physics 1, Physics C, and Computer Science A — the core fact each course is built on, and where to go for full-depth review.

SECTIONS	8	WORKED EXAMPLES	1	FORMAT	Print friendly
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How to use this guide

A formula you cannot place is not knowledge yet. Work the recall drill below before the questions.

- Use this guide to confirm which course-specific review guide to open next — it is a map, not a replacement for each subject's full guide.
- If a row here is unfamiliar, that is the signal to start with that subject's dedicated review guide and worksheet.
- Multiple AP STEM courses share exam season — build a study calendar that spaces courses rather than cramming several the same week.

1. AP Precalculus

NAME	FORMULA	WHEN TO USE
Function behavior	identify domain, range, end behavior, and rate of change before graphing	Analyzing any function type (polynomial, rational, exponential, trig).
Unit circle values	sin/cos/tan at 0, 30, 45, 60, 90 degrees and their reference angles	Any trigonometric evaluation question.

2. AP Calculus AB/BC

NAME	FORMULA	WHEN TO USE
Derivative as rate of change	$f'(x)$ gives the instantaneous rate of change of f at x	Any rates, tangent line, or motion question.
Fundamental Theorem of Calculus	the definite integral of f from a to b equals $F(b) - F(a)$	Evaluating a definite integral or area under a curve.
BC-only topics	series, parametric/polar curves, and Taylor polynomials appear only on the BC exam	Deciding which topics apply to an AB vs. a BC student.

3. AP Statistics

NAME	FORMULA	WHEN TO USE
Mean vs. median with outliers	mean is pulled toward outliers; median resists them	Choosing the better measure of center for skewed data.
p-value interpretation	the probability of data this extreme, ASSUMING the null hypothesis is true	Any hypothesis test conclusion.

4. AP Biology

NAME	FORMULA	WHEN TO USE
Natural selection	requires heritable variation, differential survival/reproduction, and an environmental pressure	Explaining how a population's traits change over generations.
Central dogma	DNA is transcribed to mRNA, mRNA is translated to protein	Any gene expression question.

5. AP Chemistry

NAME	FORMULA	WHEN TO USE
Moles as the chemist's counting unit	$\text{mol} = \text{mass} / \text{molar mass} = \text{number of particles} / 6.022 \times 10^{23}$	Converting between mass, particles, and moles in any stoichiometry problem.
Le Chatelier's principle	a system at equilibrium shifts to counteract an applied stress	Predicting how a change in concentration, pressure, or temperature affects equilibrium.

6. AP Physics 1

NAME	FORMULA	WHEN TO USE
Newton's second law	$F_{\text{net}} = ma$	Any force-and-motion question.
Conservation of energy	total mechanical energy is conserved absent non-conservative forces like friction	Motion problems where speed at one point is found from height or spring compression at another.

7. AP Physics C

NAME	FORMULA	WHEN TO USE
Calculus-based kinematics	velocity is the derivative of position; acceleration is the derivative of velocity	Motion problems where position is given as a function of time.

NAME	FORMULA	WHEN TO USE
Physics C: Mechanics vs. E&M	Mechanics covers motion, forces, and rotation; E&M covers charge, fields, and circuits – they are separate exams	Deciding which exam's content a topic belongs to.

8. AP Computer Science A

NAME	FORMULA	WHEN TO USE
Variables and primitive types	int, double, boolean, and String store a single typed value	Declaring and assigning any variable in Java.
Arrays and ArrayLists	arrays have a fixed size set at creation; ArrayLists can grow and shrink	Choosing a data structure for a fixed vs. changing collection.
Classes and objects	a class is the blueprint; an object is a specific instance built from it	Any object-oriented design question.

WORKED EXAMPLE

A method searches an array for a target value and returns its index, or -1 if not found. Identify the algorithm and its typical time complexity on an unsorted array.

1. Check each element in order until a match is found or the array ends
2. This is linear search
3. Time complexity: $O(n)$, since every element may need to be checked

Check: Binary search would be $O(\log n)$, but only works on a sorted array — this array is not stated to be sorted.

Notes and tutor hand-off

Bring this page to your next session so the tutor can start from what actually blocked you.

Which of the eight AP STEM courses needs its own full-depth review guide next?

Are two AP exam dates close together this season? List them and build a spacing plan:

Worksheet question numbers to review with a tutor:
