TPHS Course Profile

AP Calculus AB

Any Grade Level Student with "C" or better in Integrated Math 3 Honors, Integrated Math 2/3 Honors Accelerated or Introduction to Calculus (10 Credits)

- ***Meets high school graduation requirement for math credits***
- ***Meets the UC/CSU subject area "C-Mathematics" requirement***

General Information

Description

In **AP Calculus AB**, students will learn concepts such as:

- Evaluating Limits: direct substitution, factor and reduce, multiply by conjugate, find common denominator, divide by highest power of variable – and later in course by L'Hospital's Rule.
- Finding Derivatives of polynomial functions, rational functions, exponential functions, logarithmic functions, trigonometric and inverse trigonometric functions: by definition; product, quotient, chain rules; trigonometric and inverse trigonometric; logarithmic and exponential; implicit differentiation; logarithmic differentiation.
- Applications of Derivatives: equation of tangent line; relative extrema and inflection points; optimization word problems; related rates word problems; position, velocity, and acceleration in function form.
- Methods of Integration: numerical approximation by Riemann Sum or Trapezoidal Rule; power, exponential, logarithmic, trigonometric and inverse trigonometric, algebraic substitution.
- Applications of Integration: area, volumes of solids of revolution, volumes of solids with known base and cross section, arc length; acceleration, velocity, and position; solve differential equations (variable separable and using slope fields).

Expectations and Goals

Students must have a "C" or better in

- Integrated Math 2/3 Honors Accelerated
- Or, Integrated Math 3 Honors
- Or, Introduction to Calculus

Students entering AP Calculus AB should already have a good understanding of the following concepts:

- Simplifying expressions, solving equations and inequalities (linear, polynomial, rational, radical,
- exponential, logarithmic, absolute value); solving systems of linear and polynomial equations.
- Writing equations of linear functions: slope-intercept form, point-slope form, etc.
- Graphing (and recognizing the graphs of) functions and relations including x- and y- intercepts, horizontal, and vertical asymptotes.
- Setting up and solving word problems involving the algebra skills listed above.

- Unit circle values (cos, sin, etc.) for the traditional multiples of $\frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2} and \pi$.
- Identities (Pythagorean, sum and difference, half and double angle).
- Solving trigonometric equations and systems of equations.
- Graphs of trigonometric functions in the xy-plane. For example, $y = a\cos b(x - c) + d.$
- Application of trigonometry to geometric figures. SKILL OR KNOWLEDGE BASE
- Midpoint, slope, distance formulas.
- Area formulas for common plane figures.
- Lateral area, surface area, and volume formulas for common 3-D figures.

Students entering **AP Calculus AB** should also be able to solve problems such as

Sketch the graph of the following equations without a calculator

$y = mx + b$ $y = a(x+h)^2 + k$ $x^2 + y^2 = r^2$ $y = \ln x$ $y = \frac{1}{x}$

$y = x^3$ $y = |x + h|$ $y = e^x$ $y = 2^x$ $y = \left(\frac{1}{2}\right)^2$

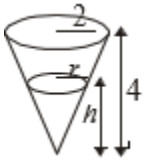
Solve for x without using a calculator

$\theta = \frac{\pi}{6}$

$2\sqrt{3}$

$\sqrt{12 - x^2}$

Shown is a conical tank partially filled with water. Write the formula for the volume of the water as a function of only h.



Estimated Homework

Students will be expected to spend on average of approximately 2 hours outside of class on homework for teach class period. (This is a general guideline for planning and scheduling purposes. A student's individual ability level and competency may affect the actual preparation times needed.)

There may also be projects such as activities and reports after the AP exam.

This Class Is Best For…

Students entering AP Calculus AB are expected to do the following things:

- Learn concepts and skills quickly.
- Maintain proficiency in above skills as they are applied to new skills.
- Handle the rigor of learning new concepts every day and use new concepts throughout the course.
- Quickly recall concepts and skills learned in previous courses but needed in this course—there is no time to re-teach "old" skills.

Other indicators of potential success in AP Calculus AB include a 70% or above on the Calculus Readiness Test.

Course Materials

Required Materials

Text book: *Calculus: Early Transcendentals*, 6th edition, Brooks/Cole 2007, Stewart.