

Calculus: The preliminaries:

What is on the AP Test?

The Test

There are 2 different AP tests for Calculus. AB and BC

AB covers – functions, limits, graphs of functions, continuity, definition and computation of derivatives, second derivatives, relationships between graphs of functions and their derivatives, applications of derivatives finding anti-derivatives, definite integrals, fundamental theorem of calculus, numerical approximations of definite integrals, separable differential equations, applications of integrals and slope fields.

BC covers all of the AB topics plus --- parametric, polar, and vector functions, polynomial approximations and series.

The Review

In your study of mathematics to date, you have spent many years learning arithmetic, algebra, geometry and trigonometry. These are the foundations on which you will build your knowledge of calculus. So let us do a little review.

Fractions:

The arithmetic of fractions needs to be understood well. This means you must be able to handle simple fractions and algebraic fractions. Know how to add and subtract fractions using the bow-tie method and by the traditional method of converting to a common denominator.

Know how to multiply fractions through using the methods of straight across, cancel then straight across, factor then cancel then straight across.

Know how to divide fractions by simply multiplying by the reciprocal.

Section 1.1 Lines

Definition: Increments: If a particle moves from the point (x_1, y_1) to the point (x_2, y_2) the increments in its coordinates are $\Delta x = x_2 - x_1$ and $\Delta y = y_2 - y_1$

Definition: Slope Let P (x_1, y_1) and Q (x_2, y_2) be points on a nonvertical line, L. The slope of L is $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Parallel and Perpendicular Lines:

Parallel lines have the same slope

Perpendicular lines have opposite reciprocal slopes.

Definition: Point-Slope Equation

The equation $y = m(x - x_1) + y_1$ is the point-slope equation of the line through the point (x_1, y_1) with slope m .

Definition: Slope-Intercept Equation

The equation $y = mx + b$ is the slope-intercept of the line with slope m and y-intercept b .

Definition: General Linear Equation:

The equation $Ax + By = C$ (A and B not both 0) is a general linear equation in x and y .

Regression Analysis

Regression analysis has four steps:

1. Plot the data in a scatter plot.
2. Find the regression equation. For a line, it has the form $y = mx + b$.
3. Superimpose the graph of the regression equation on the scatter plot to see the fit.
4. Use the regression equation to predict y -values for particular values of x .