INGLÉS		PORCENTAJE
PRÁCTICA PARA LA PRUEBA DE SUFICIENCIA		

INSTRUMENTO DE PREEVALUACIÓN

[1] Derivative, in mathematics, the rate of change of a function with respect to a variable. Derivatives are fundamental to the solution of problems in calculus and differential equations. In general, scientists observe changing systems (dynamical systems) to obtain the rate of change of some variable of interest, incorporate this information into some differential equation, and use integration techniques to obtain a function **that** can be used to predict the behaviour of the original system under diverse conditions.

[2] Geometrically, the derivative of a function can be interpreted as the slope of the graph of the function or, more precisely, as the slope of the tangent line at a point. **Its** calculation, in fact, derives from the slope formula for a straight line, except that a limiting process must be used for curves. The slope is often expressed as the "rise" over the "run," or, in Cartesian terms, the ratio of the change in y to the change in x. For the straight line shown in the figure, the formula for the slope is $(y_1 - y_0)/(x_1 - x_0)$. Another way to express this formula is $[f(x_0 + h) - f(x_0)]/h$, if h is used for $x_1 - x_0$ and $f(x)$ for y. This change in notation is useful for advancing from the idea of the slope of a line to the more general concept of the derivative of a function.

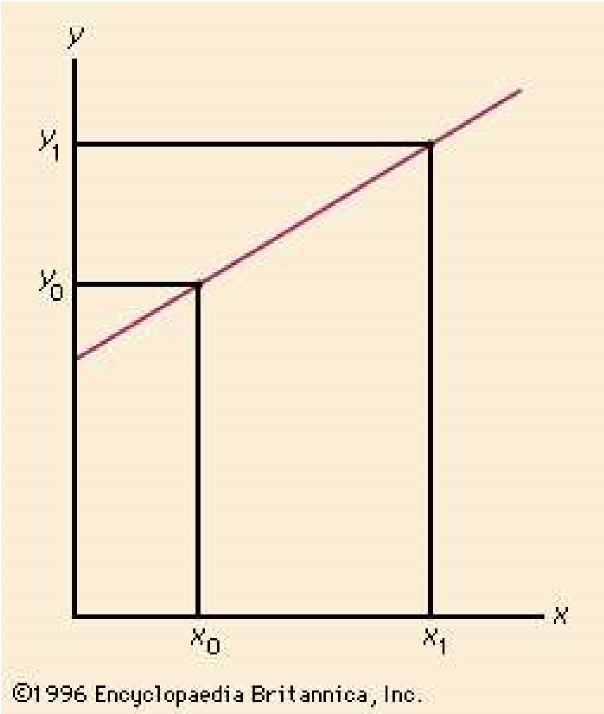
[3] For a curve, this ratio depends on where the points are chosen, reflecting the fact that curves do not have a constant slope. To find the slope at a desired point, the choice of the second point needed to calculate the ratio represents a difficulty because, in general, the ratio will represent only an average slope between the points, rather than the actual slope at either point (*see* figure). To get around this difficulty, a limiting process is used whereby the second point is not fixed but specified by a variable, as h in the ratio for the straight line above. Finding the limit in this case is a process of finding a number **that** the ratio approaches as h approaches 0, so that the limiting ratio will represent the actual slope at the given point. Some manipulations must be done on the quotient $[f(x_0 + h) - f(x_0)]/h$ so that **it** can be rewritten in a form in which the limit as h approaches 0 can be seen more directly. Consider, for example, the parabola given by x^2. In finding the derivative of x^2 when x is 2, the quotient is $[(2 + h)^2 - 2^2]/h$. By expanding the numerator, the quotient becomes $(4 + 4h + h^2 - 4)/h = (4h + h^2)/h$. Both numerator and denominator still approach 0, but if h is not actually zero but only very close to it, then h can be divided out, giving $4 + h$, **which** is easily seen to approach 4 as h approaches 0.

[4] To sum up, the derivative of $f(x)$ at x_0, written as $f'(x_0)$, $(df/dx)(x_0)$, or $Df(x_0)$, is defined as

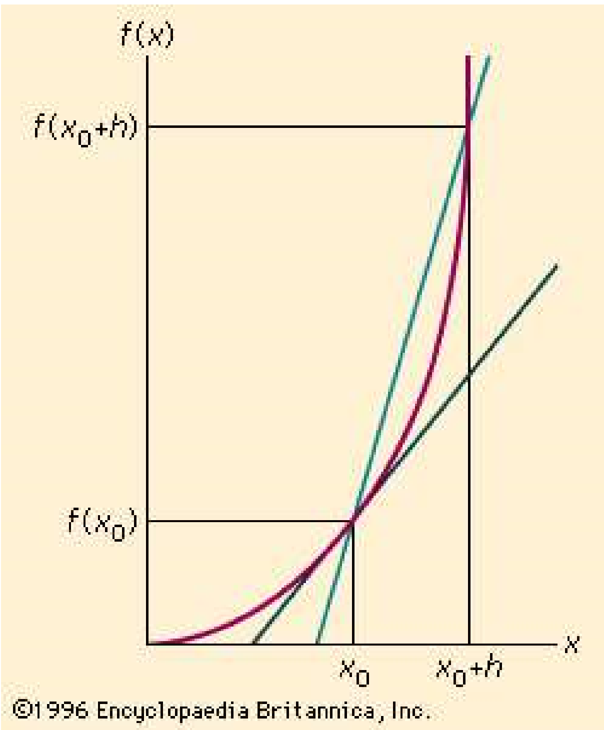
$$\lim_{h \to 0} [f(x_0 + h) - f(x_0)]/h$$

if this limit exists.

[5] Differentiation–i.e., calculating the derivative–seldom requires the use of the basic definition but can instead be accomplished through a knowledge of the three basic derivatives, the use of four rules of operation, and a knowledge of how to manipulate functions.



Two points, such as (x_0, y_0) and (x_1, y_1), determine the slope of a straight line.



The slope, or instantaneous rate of change, for a curve at a particular point (x_0, $f(x_0)$) can be determined by observing the limit of the average rate of change as a second point ($x_0 + h$, $f(x_0 + h)$) approaches the original point.

1. VOCABULARIO.(a). Encuentre sinónimos de las siguientes palabras:

1. primary (r. 2) ______________________
2. comes (r. 9) ______________________
3. show (r. 19) ______________________
4. get near (r. 29) ______________________
5. that is (r. 36) ______________________

2. VOCABULARIO.(b). Encuentre antónimos de las siguientes palabras:

1. eliminate (r. 4) ______________________
2. rarely (r. 10) ______________________
3. advantage (r. 18) ______________________
4. hypothetical (r. 24) ______________________
5. without (r. 37) ______________________

3. REFERENCIA EN EL CONTEXTO. Lea nuevamente el texto y consigne a qué hacen referencia las palabras dadas.

1. that (r. 5) ______________________
2. its (r. 8) ______________________
3. that (r.23) ______________________
4. it (r.25) ______________________
5. which (r.30) ______________________

4. LECTOCOMPRENSIÓN. (a) Consulte el texto e indique si las siguientes oraciones son verdaderas o falsas (V/F). Consigne los renglones de referencia.

V/F	ORACIÓN	Renglón
	1. El cálculo de la derivada no procede de la fórmula de la pendiente de una línea recta.	
	2. Rara vez se requiere el uso de la definición básica al calcular la derivada.	
	3. Los científicos no observan generalmente a los sistemas dinámicos para obtener el régimen de variación de alguna variable de interés.	
	4. Es muy fácil elegir el segundo punto necesario en el cálculo de la relación para hallar la pendiente en un punto determinado.	
	5. La fórmula de la pendiente es $(y_1 - y_0)/(x_1 - x_0)$ para la línea recta que aparece en la figura.	

5. LECTOCOMPRENSIÓN. (b) Consulte el texto y responda las siguientes preguntas en castellano. Indique las referencias de renglón.

1. ¿Cómo se puede interpretar a la derivada geométricamente? **Renglón ►** ____

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2. ¿Cómo se expresa a menudo la pendiente en términos cartesianos? **Renglón ►** ____

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3. ¿Para qué son fundamentales las derivadas? **Renglón ►** ____

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6. VERIFICACIÓN DEL CONTENIDO. Lea minuciosamente el texto y recomponga los conceptos compatibilizando el contenido de ambas columnas.

	The slope of a straight line is determined…	**A**	…points are chosen in the case of a curve.
	The ratio will represent only…	**B**	…by two points such as (x_0, y_0) and (x_1, y_1).
	The ratio depends on where the…	**C**	…of problems in calculus and differential equations.
	The derivative of a function can be interpreted…	**D**	…of a function with respect to a variable.
	Derivatives are fundamental to the solution…	**E**	…an average slope between the points.
	Derivative is the rate of change…	**F**	…as the slope of the tangent line at a point.