Podemos señalar las siguientes conclusiones:

- En los tiempos simples sólo se emplea el auxiliar DO para la formación del negativo y el interrogativo.
- Los auxiliares WILL y WOULD se emplean para la formación del futuro y el condicional en todos los grupos, respectivamente.
- Cualquier tiempo continuo surge de la combinación del auxiliar BE con el participio presente (BE + V_{ING}).
- Cualquier tiempo perfecto surge de la combinación del auxiliar HAVE con el participio pasado. (HAVE + $V_{PARTICIPIO}$).

PRONOMBRES PERSONALES

Debido a que en inglés los verbos no son desinenciales, es obligatorio el empleo de los pronombres personales al conjugar cualquiera de los tiempos. Es por ello que los incluimos a continuación:

PRONOMBRES PERSONALES	SINGULAR	PLURAL	
1ra.	I	WE	SUJETO
2da.	YOU	YOU	
3ra.	HE, SHE, IT	THEY	

En los esquemas empíricos que detallamos a continuación sustituiremos globalmente a los pronombres personales con la letra "S" (sujeto).

Gottfried Wilhelm (von) Leibniz (1 July 1646 – 14 November 1716) was a German polymath and philosopher who occupies a prominent place in the history of mathematics and the history of philosophy, having developed differential and integral calculus independently of Isaac Newton. Leibniz's notation has been widely used ever since it was published. It was only in the 20th century that his Law of Continuity and Transcendental Law of Homogeneity found mathematical implementation (by means of non-standard analysis). He became one of the most prolific inventors in the field of mechanical calculators. While working on adding automatic multiplication and division to Pascal's Calculator, he was the first to describe a pinwheel calculator in 1685 and invented the Leibniz wheel, used in the arithmometer, the first mass-produced mechanical calculator. He also refined the binary number system, which is the foundation of virtually all digital computers.

Leibniz made major contributions to physics and technology, and anticipated notions that surfaced much later in philosophy, probability theory, biology, medicine, geology, psychology, linguistics, and computer science. He wrote works on philosophy, politics, law, ethics, theology, history, and philology. Leibniz also contributed to the field of library science. While serving as overseer of the Wolfenbüttel library in Germany, he devised a cataloging system that would serve as a guide for many of Europe's largest libraries. Leibniz's contributions to this vast array of subjects were scattered in various learned journals, in tens of thousands of letters, and in unpublished manuscripts. He wrote in several languages, but primarily in Latin, French, and German. There is no complete gathering of the writings of Leibniz translated into English.

GRUPO DE TIEMPOS SIMPLES

Hay cuatro tiempos dentro de este grupo: presente, pasado, futuro y condicional los cuales sirven de base para construir los tiempos de los grupos restantes. Cada tiempo se representará por medio de un esquema empírico según se muestra a continuación. Junto con la denominación del tiempo se incluye sus elementos constitutivos.

PRESENTE SIMPLE (do) (V_{BASE}) ....

Afirmativo	S + V_{BASE} + *s*	I work He works
Negativo	S + do / does +not+ V_{BASE}	I do not work He does not work
Interrogativo	Do / Does + S + V_{BASE} ?	Do you work? Does he work?

PASADO SIMPLE (did) (V_{PASADO}) (V_{BASE}) ....

Afirmativo	S + V_{PASADO}	I worked He worked
Negativo	S + did +not+ V_{BASE}	I did not work He did not work
Interrogativo	Did + S + V_{BASE} ?	Did you work? Did he work?

FUTURO SIMPLE (will) (V_{BASE}) ....

Afirmativo	S +will+ V_{BASE}	I will work He will work
Negativo	S + will +not+ V_{BASE}	I will not work He will not work
Interrogativo	Will + S + V_{BASE} ?	Will you work? Will he work?

CONDICIONAL SIMPLE (would) (V_{BASE}) ....

Afirmativo	S +would+ V_{BASE}	I would work He would work
Negativo	S + would +not+ V_{BASE}	I would not work He would not work
Interrogativo	Would + S + V_{BASE} ?	Would you work? Would he work?

CASO PARTICULAR DEL VERBO "TO BE"

El verbo TO BE es un verbo irregular, no sólo en sus inflexiones sino también en la construcción de los tiempos presente y pasado. Veamos ahora sus inflexiones:

La construcción de los tiempos presente simple y pasado simple no obedece al esquema empírico consignado previamente para los mismos. La irregularidad se manifiesta a través de la no utilización de los verbos auxiliares en la formación del negativo y el interrogativo.

PRESENTE SIMPLE: VERBO TO BE

AFIRMATIVO	*NEGATIVO*	*INTERROGATIVO*
I am	I am not	Am I ?
You are	You are not (aren't)	Are you ?
He is	He is not (isn't)	Is he ?
She is	She is not	Is she ?
It is	It is not	Is it ?
We are	We are not	Are we ?
You are	You are not	Are you ?
They are	They are not	Are they?

PASADO SIMPLE: VERBO TO BE

AFIRMATIVO	*NEGATIVO*	*INTERROGATIVO*
I was	I was not	Was I ?
You were	You were not (weren't)	Were you ?
He was	He was not (wasn't)	Was he ?
She was	She was not	Was she ?
It was	It was not	Was it ?
We were	We were not	Were we ?
You were	You were not	Were you ?
They were	They were not	Were they?

El futuro simple y el condicional simple se construyen de acuerdo con el esquema general consignado anteriormente. Es decir:

FUTURO SIMPLE (will) (BE)

A	S +will+ BE	It will be They will be
N	S + will +not+ BE	It will not be They will not be
I	Will + S + BE ?	Will it be? Will they be?

CONDICIONAL SIMPLE (would) (BE)

A	S + would+ BE	It would be They would be
N	S + would +not+ BE	It would not be They would not be
I	Would + S + BE ?	Would it be? Would they be?

GRUPO DE TIEMPOS CONTINUOS

Los elementos constitutivos de este grupo de tiempos son el verbo auxiliar TO BE y el verbo característico Ving. Para proceder a la construcción de los mismos sólo basta colocar al verbo auxiliar en el tiempo correspondiente. Por ejemplo, en el presente continuo, el auxiliar va en presente; en el pasado continuo, el auxiliar va en pasado, y así sucesivamente. Elaboremos ahora dichos tiempos.

PRESENTE CONTINUO (be) (V_{ING}) ....

Afirmativo	S + Am / are / is + V_{ING}	I am working He is working
Negativo	S + Am / are / is +not + V_{ING}	I am not working He is not working
Interrogativo	Am / are / is + S + V_{ING} ?	Are you working? Is he working?

PASADO CONTINUO (be) (V_{ING}) ....

Afirmativo	S + was / were + V_{ING}	I was working They were working
Negativo	S + was / were +not + V_{ING}	I was not working They were not working
Interrogativo	was / were + S + V_{ING} ?	Are you working? Were they working?

FUTURO CONTINUO (be) (V_{ING}) ....

Afirmativo	S + will + be + V_{ING}	I will be working He will be working
Negativo	S + will +not + be + V_{ING}	I will not be working He will not be working
Interrogativo	will + S + be + V_{ING} ?	Will you be working? Will he be working?

CONDICIONAL CONTINUO (be) (V_{ING}) ....

Afirmativo	S + would + be + V_{ING}	I would be working He would be working
Negativo	S + would +not + be + V_{ING}	I would not be working He would not be working
Interrogativo	would + S + be + V_{ING} ?	Would you be working? Would he be working?

GRUPO DE TIEMPOS PERFECTOS

Los elementos constitutivos de este grupo de tiempos son el verbo auxiliar TO HAVE y el verbo característico $V_{PARTICIPIO}$. Para proceder a la construcción de los mismos sólo basta colocar al verbo auxiliar en el tiempo correspondiente. Por ejemplo, en el presente perfecto, el auxiliar va en presente; en el pasado perfecto, el auxiliar va en pasado, y así sucesivamente. Elaboremos ahora dichos tiempos.

PRESENTE PERFECTO (have) ($V_{PARTICIPIO}$) ....

Afirmativo	S + have + $V_{PARTICIPIO}$ has	I have worked He has worked
Negativo	S + have +not+ $V_{PARTICIPIO}$ has	I have not worked He has not worked
Interrogativo	Have + S + $V_{PARTICIPIO}$? Has	Have you worked? Has he worked?

PASADO PERFECTO (have) ($V_{PARTICIPIO}$) ....

Afirmativo	S + had + $V_{PARTICIPIO}$	I had worked He had worked
Negativo	S + had +not+ $V_{PARTICIPIO}$	I had not worked He had not worked
Interrogativo	Had + S + $V_{PARTICIPIO}$?	Had you worked? Had he worked?

FUTURO PERFECTO (have) ($V_{PARTICIPIO}$) ....

Afirmativo	S + will + have + $V_{PARTICIPIO}$	I will have worked He will have worked
Negativo	S + will +not + have + $V_{PARTICIPIO}$	I will not have worked He will not have worked
Interrogativo	will + S + have + $V_{PARTICIPIO}$?	Will you have worked? Will he have worked?

CONDICIONAL PERFECTO (have) ($V_{PARTICIPIO}$) ....

Afirmativo	S + would + have + $V_{PARTICIPIO}$	I would have worked He would have worked
Negativo	S + would +not + have + $V_{PARTICIPIO}$	I would not have worked He would not have worked
Interrogativo	would + S + have + $V_{PARTICIPIO}$?	Would you have worked? Would he have worked?

EJERCICIOS DE APLICACIÓN

13-1 IDENTIFICAR EL TIEMPO DE LOS VERBOS SUBRAYADOS EN LAS SIGUIENTES ORACIONES DE ACUERDO CON EL ESQUEMA PROVISTO:

PR	Presente
PS	Pasado
FT	Futuro
CD	Condicional

S	Simple
C	Continuo
P	Perfecto

1) ☐ ☐ ... the program **is waiting** for a particular I/O operation ...

2) ☐ ☐ … the controller **will start** the transfer of data …

3) ☐ ☐ … a high-priority process **would be waiting** for a lower one to finish…

4) ☐ ☐ … the user **did not gain** unauthorized control of the computer …

5) ☐ ☐ … a process **was waiting** for this request to complete.

6) ☐ ☐ … this use of microprocessors **had become** so common …

7) ☐ ☐ … each subtask **will be executing** in parallel with the others …

8) ☐ ☐ … this use of microprocessors **has become** so common …

9) ☐ ☐ … interrupt service routines **would disrupt** the proper operation.

10) ☐ ☐ … using critical sections **would have caused** performance degradation.

11) ☐ ☐ The device controller **operates** the device hardware ...

12) ☐ ☐ The reader will **have realized** that paging is similar to using a table.

13-2 IDENTIFICAR LOS VERBOS, SUBRAYARLOS Y SEÑALAR SU TIEMPO

1. The increasing distances between images show that the velocity is continuously changing; the ball is accelerating downward. Careful measurement shows that the velocity change is the same in each time interval, so the acceleration of the freely falling ball is constant.

2. The most familiar example of motion with (nearly) constant acceleration is a body falling under the influence of the earth's gravitational attraction. **Such motion** has held the attention of philosophers and scientists since ancient times. In the fourth century B.C., Aristotle thought (erroneously) that heavy bodies fall faster than light bodies, in proportion to **their** weight. Nineteen centuries later, Galileo argued that a body should fall with a downward acceleration **that** is constant and independent of **its** weight.

13-3 RESOLVER LOS SIGUIENTES EJERCICIOS SOBRE EL TEXTO 13.2.2

13-3.1 REFERENCIA EN EL CONTEXTO. Consignar a qué hacen referencia las siguientes palabras.

1. such motion (r. 2)
2. their (r. 5)
3. that (r. 6)
4. it (r. 7)

13-3.2 COMPRENSION DE PALABRAS.

Consultar el texto y encontrar sinónimos de las siguientes palabras:

1. pull (r. 2)
2. considered (r. 4)
3. held (r. 5)

Consultar el texto y encontrar antónimos de las siguientes palabras:

1. least (r. 1)
2. A.D. (r. 3)
3. irrespective of (r. 5)

13-3.3 **COMPRENSION DEL TEXTO.** Consulte el texto y responda las siguientes preguntas en castellano. Indique las referencias de línea.

1. ¿Qué pensaba Aristóteles? Renglón ▶

2. ¿Qué representa un cuerpo en caída influido por la gravedad? Renglón ▶

3. ¿Qué argumentó Galileo? Renglón ▶

Amalie Emmy Noether (23 March 1882 – 14 April 1935) was a German mathematician known for her landmark contributions to abstract algebra and theoretical physics. She was described by Pavel Alexandrov, Albert Einstein, Jean Dieudonné, Hermann Weyl, and Norbert Wiener as the most important woman in the history of mathematics. As one of the leading mathematicians of her time, she developed the theories of rings, fields, and algebras. In physics, Noether's theorem explains the connection between symmetry and conservation laws. She originally planned to teach French and English after passing the required examinations, but instead studied mathe–matics at the University of Erlangen, where her father lectured.

Noether's mathematical work has been divided into three "epochs". In the first (1908–19), she made contributions to the theories of algebraic invariants and number fields. Her work on differential invariants in the calculus of variations, Noether's theorem, has been called "one of the most important mathematical theorems ever proved in guiding the development of modern physics". In the second epoch (1920–26), she began work that "changed the face of [abstract] algebra". In her classic paper Theory of Ideals in Ring Domains (1921) Noether developed the theory of ideals in commutative rings into a tool with wide-ranging applications. She made elegant use of the ascending chain condition, and objects satisfying it are named Noetherian in her honor. In the third epoch (1927–35), she published works on noncommutative algebras and hypercomplex numbers and united the representation theory of groups with the theory of modules and ideals. In addition to her own publications, Noether was generous with her ideas and is credited with several lines of research published by other mathematicians, even in fields far removed from her main work, such as algebraic topology.

UNIDAD 14 ESQUEMA GENERAL DE VERBOS (VOZ PASIVA)

Los verbos, en general, pueden ser activos o pasivos según el punto de vista bajo el cual se considera al ejecutor de la acción o la acción misma. Si el ejecutor es más importante, se emplea la voz activa; si la acción es más importante, se emplea la voz pasiva. En el lenguaje científico se suele emplear la voz pasiva con mucha frecuencia; es por ello que reviste gran importancia su conocimiento. Al igual que los verbos en voz activa, los verbos pasivos responden a un esquema genérico a partir del cual se puede construir todos los tiempos correspondientes. Veamos ahora dicho esquema:

$$\text{VERBO PASIVO} = \text{BE} + V_{\text{PARTICIPIO}}$$

Es decir, el verbo pasivo surge de la combinación del verbo TO BE y el participio pasado ($V_{\text{PARTICIPIO}}$). Generalmente se emplea las terceras personas, singular y plural.

PRESENTE SIMPLE

Afirmativo	S + Am / are / is + $V_{\text{PARTICIPIO}}$	It is prepared They are prepared
Negativo	S + Am / are / is +not + $V_{\text{PARTICIPIO}}$	It is not prepared They are not prepared
Interrogativo	Am / are / is + S + $V_{\text{PARTICIPIO}}$?	Is it prepared ? Are they prepared ?

PASADO SIMPLE

Afirmativo	S + was / were + $V_{\text{PARTICIPIO}}$	It was prepared They were prepared
Negativo	S + was / were +not + $V_{\text{PARTICIPIO}}$	It was not prepared They were not prepared
Interrogativo	was / were + S + $V_{\text{PARTICIPIO}}$?	Was it prepared ? Were they prepared ?

FUTURO SIMPLE

Afirmativo	S +will+ be + $V_{\text{PARTICIPIO}}$	It will be prepared They will be prepared
Negativo	S + will +not+ be + $V_{\text{PARTICIPIO}}$	It will not be prepared They will not be prepared
Interrogativo	Will + S + be + $V_{\text{PARTICIPIO}}$?	Will it be prepared? Will they be prepared?

CONDICIONAL SIMPLE

Afirmativo	S +would+ be + $V_{PARTICIPIO}$	It would be prepared They would be prepared
Negativo	S + would +not+ be + $V_{PARTICIPIO}$	It would not be prepared They would not be prepared
Interrogativo	Would + S + be + $V_{PARTICIPIO}$?	Would it be prepared? Would they be prepared?

PRESENTE CONTINUO

Afirmativo	Am S + are+ being + $V_{PARTICIPIO}$ is	It is being prepared They are being prepared
Negativo	Am S + are +not + being + $V_{PARTICIPIO}$ is	It is not being prepared They are not being prepared
Interrogativo	Am are+ S + being + $V_{PARTICIPIO}$? is	Is it being prepared ? Are they being prepared?

PASADO CONTINUO

Afirmativo	S + was+ being + $V_{PARTICIPIO}$ were	It was being prepared They were being prepared
Negativo	S + was +not + being + $V_{PARTICIPIO}$ were	It was not being prepared They were not being prepared
Interrogativo	was+ S + being + $V_{PARTICIPIO}$? were	Was it being prepared ? Were they being prepared?

PRESENTE PERFECTO (have) ($V_{PARTICIPIO}$)

Afirmativo	S + have + been + $V_{PARTICIPIO}$ has	It has been prepared They have been prepared
Negativo	S + have +not+ been + $V_{PARTICIPIO}$ has	It has not been prepared They have not been prepared
Interrogativo	Have + S + been + $V_{PARTICIPIO}$? Has	Has it been prepared? Have They been prepared?

PASADO PERFECTO (have) (V PARTICIPIO)

Afirmativo	S + had + been + V PARTICIPIO	It had been prepared They had been prepared
Negativo	S + had +not+ been + V PARTICIPIO	It had not been prepared They had not been prepared
Interrogativo	Had + S + been + V PARTICIPIO ?	Had you been prepared? Had they been prepared?

FUTURO PERFECTO (have) (V PARTICIPIO)

Afirmativo	S + will + have + been + V PARTICIPIO	It will have been prepared They will have been prepared
Negativo	S + will +not + have + been + V PARTICIPIO	It will not have been prepared They will not have been prepared
Interrogativo	will + S + have + been + V PARTICIPIO?	Will it have been prepared? Will they have been prepared?

CONDICIONAL PERFECTO (have) (V PARTICIPIO)

Afirmativo	S + would + have + been + V PARTICIPIO	It would have been prepared They would have been prepared
Negativo	S + would +not + have + been + V PARTICIPIO	It would not have been prepared They would not have been prepared
Interrogativo	would + S + have + been + V PARTICIPIO?	Would you have been prepared? Would they have been prepared?

Para completar los conceptos vertidos más arriba, hay ciertos aspectos relacionados con la voz pasiva que deben ser tenidos en cuenta:

1. La voz pasiva se emplea en Inglés con mucha mayor frecuencia que en otros idiomas. Por esto, no se recomienda al estudiante de lengua extranjera que emplee la voz pasiva simplemente cuando lo haría en su propio idioma. En la mayoría de los casos su producción se vería artificial.
2. No es la construcción pasiva lo que normalmente provoca dificultades al estudiante, sino el uso de la misma cuando su utilización resulta típica en Inglés.

3. La voz pasiva se emplea preferentemente en los siguientes casos:

3.1 Cuando el interés principal del interlocutor se concentra en la acción misma y no particularmente en el ejecutor de la acción, es decir, el sujeto de la acción no es importante.

The new machines will be commissioned in a week.
(Lo importante es la puesta en marcha de las máquinas y no quién la realiza)

3.2 Cuando el ejecutor de la acción es desconocido o indeterminado, es decir, cuando el sujeto del verbo activo es uno de los siguientes:

somebody/someone, anybody/anyone, nobody/no one, everybody everyone, people, they, etc. y son usados de manera indefinida.

oración pasiva: *The circuit is being repaired.*

oración activa: ***Someone** is repairing the circuit.*

oración pasiva: *A new approach has been proposed for web management.*

oración activa: ***(They)** have proposed a new approach for web management.*

3.3 Cuando el ejecutor de la acción resulta obvio y por dicho motivo no necesita ser mencionado.

All flights have been cancelled owing to fog.
(Resulta evidente que la orden surge de la autoridad del aeropuerto).

The man was arrested for drunken driving.
(Es indiscutible que la policía realizó dicha acción).

3.4 Cuando el interlocutor quiere que su mensaje sea impersonal o menos directo por razones de tacto, diplomacia, discreción, etc. y de esa manera no queda claro quién es el ejecutor real de la acción.

Another company has already been offered the contract.
(Lo cual suena menos contundente que "*I have offered the contract ...*")

3.5 También se emplea en notificaciones oficiales, instrucciones, prohibiciones con el objeto de hacerlas impersonales y en consecuencia más cordiales y amables.

oración pasiva: *Books must be returned by the last date entered below.*

oración activa: ***You** must return books ...*

oración pasiva: *These papers are not to be taken outside the examination room.*

oración activa: ***You** are not to take these papers outside the examination room.*

3.6 En ciertas oraciones con la estructura *It is said that... + oración sustantiva* en lugar de la oración activa *Everyone says that.../People say that...* En este caso la interpretación contempla el uso obligatorio de la palabra "se". Entonces, la estructura equivalente en castellano es la siguiente:

SE + VERBO(en el mismo tiempo que "BE")+ QUE +ORACIÓN SUSTANTIVA.

Es decir:

<table>
<tr><th colspan="4">EN INGLÉS</th><th colspan="3">EN CASTELLANO</th></tr>
<tr><td rowspan="4">It</td><td>is</td><td>accepted
alleged
assumed
believed</td><td rowspan="4">that</td><td rowspan="4">Se</td><td>acepta
alega
supone
cree</td><td rowspan="4">que</td></tr>
<tr><td>has been</td><td>claimed
considered
denied
expected</td><td>ha reclamado
ha considerado
ha negado
ha previsto</td></tr>
<tr><td>will be</td><td>felt
maintained
presumed
realized</td><td>sentirá
mantendrá
supondrá
aceptará</td></tr>
<tr><td>can be</td><td>reported
stated
thought
understood</td><td>puede informar
puede expresar
puede pensar
puede comprender</td></tr>
</table>

Según se observa en la tabla, el verbo "BE" puede ocurrir en cualquier tiempo y admite además la construcción con verbos modales.

También cabe destacar que en dicha construcción frecuentemente vienen acompaña–das con los siguientes adverbios: *generally, usually, universally, widely, often, sometimes, always, wrongly, rightly, etc.*

<u>En Inglés</u>: It was universally accepted that...

<u>En castellano</u>: Se aceptó universalmente que

4. En el caso que se emplee la pasiva, pero el interlocutor deseara nombrar al ejecutor de la acción, se usa la preposición "by" para introducir al ejecutor de la acción (al cual se los denomina "agente").

The experiment was carried out <u>by Mr Finch.</u>

The results were announced <u>by a young assistant with dark hair</u>.

En consecuencia, el interlocutor puede elegir un verbo activo o un verbo pasivo con un agente según la situación y de acuerdo con lo que el interlocutor considere de interés principal.

UNIDAD 15 EL IMPERATIVO (DIRECTIVAS)

La definición habitual de "imperativo" se relaciona con una forma o construcción utilizada para impartir una orden. Sin embargo, esta resulta una acepción demasiado estrecha para el significado que usualmente se asocia a los imperativos. Por ello es preferible emplear el término más amplio de "directiva" ya que el mismo abarca órdenes, ofrecimientos, solicitudes, invitaciones, consejos e instrucciones.

Se realiza con la inflexión V_{BASE} del verbo sin la terminación de número o tiempo. Puede ser afirmativo o negativo.

- Using Equation 12, <u>*calculate*</u> $x^{(n)}$ and also <u>*calculate*</u> the limit of $x^{(n)}$ as n tends to infinity.
- <u>*Assume*</u> that a is even and that b is odd.
- <u>*Do not change*</u> the value of the determinant.

<u>EJEMPLO</u>:

How to Differentiate $y=x^3 \ln x$

[1] The derivative of x^3 is $3x^2$, but when x^3 is multiplied by another function – in this case a natural log, the process is a little more complicated.

[2] The product rule is currently used in calculus when differentiating functions that are multiplied with another function. It is a very simple procedure that only involves a little algebra.

[3] For example, to differentiate y = x^3 ln x, **proceed** as follows:

1. **Name** the first function "*f*" and the second function "*g*." **Go** in order (i.e. the first listed function should be called "*f*" and the second should be called "*g*").

   $f = x^3$

   $g = \ln x$

2. **Rewrite** the equation using the new function names *f* and *g* you started using in Step 1. **Multiply** f by the derivative of g, then **add** the derivative of f multiplied by g. You do not need to actually differentiate at this point. Just rewrite the equation.

   $y' = x^3\, D\,(\ln x) + D\,(x^3)\, \ln x$

3. **Take** the derivative of the two functions in the equation you wrote in Step 2. **Leave** the two other functions in the sequence alone.

   $y' = x^3\,(1/x) + (3x^2 \ln x).$

4. **Use** algebra to simplify the result. This step is optional, but it keeps things neat and tidy and is almost certainly required by your professor:

   $y' = x^2 + 3x^2 \ln x.$

   So, if you differentiate $y=x^3 \ln 3$, the answer is $y' = x^2 + 3x^2 \ln x$.

Existe otra forma de comunicar directivas la cual se materializa de la siguiente manera:

LET + US + V_{BASE}

y se interpreta como : *hagamos la acción del* V_{BASE} , o bien,

LET + OBJETO + BE

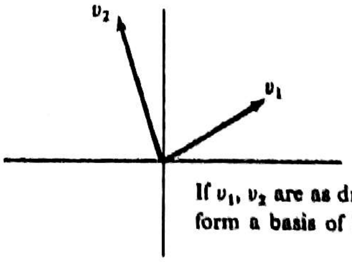
y se interpreta como : *sea + objeto.*

<u>EJEMPLOS</u>:

1. The arguments of elementary functions can be either one or two. Without loss of generality, **let us assume** that an elementary function has two arguments.
2. The space of polynomial functions over a field ***F***. **Let *F* be** a field and **let V be** the set of all functions *f* from ***F*** into ***F*** which have a rule of the form

   (2-7) $f(x) = C_0 + C_{1x} + \cdots\cdots + c_n x^n$

   where $C_0, C_1, \ldots, C_n$ are fixed scalars in F (independent of x). A function of this type is called a polynomial function on F. **Let addition and scalar multiplication be** defined as in Example 3. One must observe here that if f and g are polynomial functions and c is in ***F***, then $f + g$ and cf are again polynomial functions.
3. In Examples 5 and 6, we saw the significance of row-reduced matrices in solving homogeneous systems of linear equations. **Let us now discuss** briefly the system $RX = 0$, when R is a row-reduced echelon matrix. **Let rows 1, ... , *r* be** the non-zero rows of R, and **suppose** that the leading non-zero entry of row i occurs in column k_i. The system $RX = 0$ then consists of r non-trivial equations.
4. <u>The Intermediate Value Theorem</u>. **Suppose** that f is continuous on the closed interval [a, b] and **let *N* be** any number between $f(a)$ and $f(b)$, where $f(a) \neq f(b)$. Then there exists a number c in (a, b) such that $f(c) = N$.
5. **Let $Ax = b$ be** a linear system of n equations in n unknowns to be solved by Gauss-Jordan elimination (or, equivalently, by Gaussian elimination with back substitution). For simplicity, **let us assume** that A is invertible and that no row interchanges are required to reduce the augmented matrix [A|b] to row echelon form.
6. **Let us assume** for the moment that we can make sense of the function 2^x, and **let us see** how we could find its derivative.
7. However, there are many other bases. **Let us look** at $n = 2$. We shall find out that any two vectors which are not parallel form a basis of $\mathbf{R}^2$. **Let us first consider** an example.



If v_1, v_2 are as drawn, they form a basis of $\mathbf{R}^2$.

EJERCICIO DE APLICACIÓN

15.1 IDENTIFIQUE Y SUBRAYE LOS VERBOS IMPERATIVOS DEL TEXTO

GENERALIZED PROCEDURE

[1] The general method of attack in solving problems in applied mechanics is similar to that in any scientific investigation. The steps may be outlined as follows:

1. Select system of interest.
2. Postulate characteristics of system. This usually involves idealization and simplification of the real situation.
3. Apply principles of mechanics to the idealized model. Deduce the consequences.
4. Compare these predictions with the behavior of the actual system. This usually involves recourse to tests and experiments.
5. If satisfactory agreement is not achieved, the foregoing steps must be reconsidered. Very often progress is made by altering the assumptions regarding characteristics of the system, i.e., by constructing a different idealized model of the system.

[2] This generalized approach applies to the problems treated in this book and equally well to problems on the frontiers of research. The design engineer who must deal with mechanics follows a similar sequence but with a somewhat different motive in that it is his job to accomplish a certain desired function. He must first create a possible design, either by invention or by adaptation of prior designs, before he can analyze its behavior as in steps 1, 2, and 3. If this behavior is not compatible with the desired function, he must modify or redesign the system and repeat the analysis until an acceptable result is obtained. The criteria of acceptability include not only satisfactory technical operation but such factors as economy, minimum weight, or ease of fabrication. Acceptability may also require consideration of pollution and/or ecological factors.

Johann Carl Friedrich Gauss (30 April 1777 – 23 February 1855) was a German mathematician who made significant contributions to many fields, including number theory, algebra, statistics, analysis, differential geometry, geodesy, geophysics, mechanics, electrostatics, magnetic fields, astronomy, matrix theory, and optics.

Gauss was a child prodigy. A contested story relates that, when he was eight, he figured out how to add up all the numbers from 1 to 100. There are many other anecdotes about his precocity while a toddler, and he made his first ground-breaking mathematical discoveries while still a teenager. He completed his magnum opus, Disquisitiones Arithmeticae, in 1798, at the age of 21—though it was not published until 1801. This work was fundamental in consolidating number theory as a discipline and has shaped the field to the present day.
His breakthrough occurred in 1796 when he showed that a regular polygon can be constructed by compass and straightedge if the number of its sides is the product of distinct Fermat primes and a power of 2. This was a major discovery in an important field of mathematics; construction problems had occupied mathematicians since the days of the Ancient Greeks, and the discovery ultimately led Gauss to choose mathematics instead of philology as a career.

UNIDAD 16 EL INFINITIVO

En inglés, el infinitivo se construye de acuerdo con el siguiente esquema:

INFINITIVO = TO + V_{BASE}

Además de la forma normal (es decir, la más frecuente), que denominaremos simple, el infinitivo también responde al esquema general de verbos, tanto activos como pasivos. Veamos ahora las dis- tintas formas del infinitivo en la voces activa y pasiva.

INFINITIVO (Activo)		
	SIMPLE	*: TO WORK*
	CONTINUO	*: TO BE WORKING*
	PERFECTO	*: TO HAVE WORKED*
	PERFECTO CONTINUO	*: TO HAVE BEEN WORKING*

INFINITIVO (Pasivo)		
	SIMPLE	*: TO BE WORKED*
	CONTINUO	*: TO BE BEING WORKED*
	PERFECTO	*: TO HAVE BEEN WORKED*

INFINITIVO DE PROPÓSITO

El infinitivo también puede denotar causa o razón, es decir sirve para responder a las preguntas ¿por qué? o ¿para qué?. Veamos ahora dicha situación mediante algunos ejemplos.

- ***To solve*** these problems we form the augmented matrix A' of the system $AX = Y$ and apply an appropriate sequence of row operations to A'.
- Use the Lorentz transformation ***to write*** the velocities v_m and v_M of particles m and M in terms of the speed v_{cm} of the center of momentum.
- The parametric expression for the x- and y-coordinates is often useful ***to describe*** a motion of a particle, whose coordinates are given as a function of time t.
- Our examples show us that ***to define*** the slope of the curve at P, we should not consider what happens at a point Q which is far removed from P. Rather, it is what happens near P which is important.
- ***To understand*** more about vectors and how they combine, we start with the simplest vector quantity, *displacement*.
- We have developed enough techniques ***to be able to*** sketch curves and graphs of functions much more efficiently than before. We shall investigate systematically the behavior of a curve, and the mean value theorem will play a fundamental role.

16.1 INDICAR CON "X" CUÁLES INFINITIVOS INCLUIDOS EN EL SIGUIENTE TEXTO SON DE PROPÓSITO

[1] Physics is one of the most fundamental of the sciences. Scientists of all disciplines use the ideas of physics, including chemists who study the structure of molecules, paleontologists who try *to reconstruct* how dinosaurs walked, and climatologists who study how human activities affect the atmosphere and oceans. Physics is also the foundation of all engineering and technology. No engineer could design a flat-screen TV, an interplanetary spacecraft, or even a better mousetrap without first understanding the basic laws of physics.

[2] The study of physics is also an adventure. You will find it challenging, sometimes frustrating, occasionally painful, and often richly rewarding. If you have ever wondered why the sky is blue, how radio waves can travel through empty space, or how a satellite stays in orbit, you can find the answers by using fundamental physics. You will come *to see* physics as a towering achievement of the human intellect in its quest *to understand* our world and ourselves.

[3] In this opening chapter, we will go over some important preliminaries that we will need throughout our study. We will discuss the nature of physical theory and the use of idealized models *to represent* physical systems. We will introduce the systems of units used *to describe* physical quantities and discuss ways *to describe* the accuracy of a number. We will look at examples of problems for which we cannot (or do not want to) find a precise answer, but for which rough estimates can be useful and interesting. Finally, we will study several aspects of vectors and vector algebra. Vectors will be needed throughout our study of physics *to describe* and *analyze* physical quantities, such as velocity and force, that have direction as well as magnitude.

INFINITIVO	RENGLÓN	OTRO	PROP.
to reconstruct	3		
to see	12		
to understand	13		
to represent	16		

INFINITIVO	RENGLÓN	OTRO	PROP.
to describe	17		
to describe	18		
to describe	22		
(*) analyze	22		

16.2 INDICAR CON "X" CUÁLES INFINITIVOS INCLUIDOS EN EL SIGUIENTE TEXTO SON DE PROPÓSITO

In some treatments of vectors, one takes the relation

$$A \cdot B = \| A \| \| B \| \cos\theta$$

as definition of the scalar product. This is subject to the following disadvantages, not *to say* objections:

(a) The four properties of the scalar product **SP1** through **SP4** are then by no means obvious.

(b) Even in 3-space, one has *to rely* on geometric intuition *to obtain* the cosine of the angle between A and B, and this intuition is less clear than in the plane. In higher dimensional space, it fails even more.

(c) It is extremely hard *to work* with such a definition *to obtain* further properties of the scalar product.

Thus we prefer *to lay* obvious algebraic foundations, and then recover very simply all the properties. We used plane geometry *to see* the expression

$$A \cdot B = \| A \| \| B \| \cos\theta$$

After working out some examples, we shall prove the inequality which allows us *to justify* this in n-space.

INFINITIVO	RENGLÓN	OTRO	PROP.
to say	4		
to rely	7		
to obtain	7		
to work	10		

INFINITIVO	RENGLÓN	OTRO	PROP.
to obtain	10		
to lay	12		
to see	13		
to justify	16		

Georg Friedrich Bernhard Riemann (17 September 1826 – 20 July 1866) was a German mathematician who made contributions to analysis, number theory, and differential geometry. In the field of real analysis, he is mostly known for the first rigorous formulation of the integral, the Riemann integral, and his work on Fourier series. His contributions to complex analysis include most notably the introduction of Riemann surfaces, breaking new ground in a natural, geometric treatment of complex analysis. His famous 1859 paper on the prime-counting function, containing the original statement of the Riemann hypothesis, is regarded as one of the most influential papers in analytic number theory. Through his pioneering contributions to differential geometry, Bernhard Riemann laid the foundations of the mathematics of general relativity.

UNIDAD 17 VERBOS MODALES

Los verbos modales constituyen un subgrupo de los verbos auxiliares y modifican el significado de los verbos principales con los cuales se combinan para denotar habilidad o capacidad para realizar una acción, posibilidad, obligación, etc. Los verbos modales son irregulares ya que no poseen todas las inflexiones y defectivos porque no se conjugan en todos lo tiempos.

Veamos ahora el cuadro general en el cual se encuentran insertos los verbos modales.

VERBOS
- **PRINCIPALES (DE CONTENIDO)**
- **AUXILIARES**
  - *Propiamente Dichos*
    - DO
    - BE
    - HAVE
  - *Modales*
    - CAN - COULD
    - MAY - MIGHT
    - MUST
    - SHOULD – OUGHT TO
    - NEED

A los verbos modales los representaremos con la letra (M). El esquema general tiene la siguiente forma:

VERBOS MODALES (M) (V_{BASE}) - Voz Activa

AFIRMATIVO	S +(M)+ V_{BASE}	It can work They must work
NEGATIVO	S + (M) +not+ V_{BASE}	It should not work They could not work
INTERROGATIVO	(M) + S + V_{BASE} ?	Can it work? Must it work?

V_{BASE} representa al infinitivo sin la partícula "TO". (Recordemos que el infinitivo = TO + V_{BASE}). En consecuencia, cualquier verbo modal puede combinarse con cualquiera de los infinitivos (tanto activos como pasivos) estudiados anteriormente. Los verbos modales también aceptan la construcción con voz pasiva, según se detalla a continuación.

VERBOS MODALES (M) (V_{BASE}) - Voz Pasiva

AFIRMATIVO	S +(M)+ be + $V_{PARTICIPIO}$	It can be prepared They must be prepared
NEGATIVO	S + (M) +not+ be + $V_{PARTICIPIO}$	It may not be prepared They could not be prepared
INTERROGATIVO	(M) + S + be + $V_{PARTICIPIO}$?	Can it be prepared? Must they be prepared?

EJEMPLOS

1. We recall that the even numbers are the integers ±2, ±4, ±6, ±8, ..., which **can be written** in the form $2n$ for some integer n. An odd number is an integer like± 1, ±3, ±5, ± 7, ... , which **can be written** in the form $2n+1$ for some integer n.
2. We continue to consider the function $y = x^2$. Instead of picking a definite numerical value for the x-coordinate of a point, we **could work** at an arbitrary point on the curve.
3. In defining the slope of a curve at a point, or the derivative, we used the notion of limit, which we regarded as intuitively clear. It is indeed. You **can see** in the Appendix how one **may define** limits using only properties of numbers, but we do not worry about this here.
4. The theorems in this section are fairly obvious intuitively, and therefore you **might omit** their proofs if you wish, after understanding their statement.
5. There is actually no reason why we **should limit** ourselves to points which are described by integers. For instance we can also have the point (½, −1) and the point ($-\sqrt{2}$, 3) as shown on the figure below.
6. We turn now to the task of assigning a dimension to certain vector spaces. Although we usually associate 'dimension' with something geometrical, we **must find** a suitable algebraic definition of the dimension of a vector space. This will be done through the concept of a basis for the space.
7. Instead of using x, y, z we **could** also **use** (x_1, x_2, x_3). The line **could be called** 1-space, and the plane **could be called** 2-space.
8. By looking at this problem in $\mathbb{R}^2$ or in $\mathbb{R}^3$, one sees intuitively that a best approximation to β by vectors in W **ought to be** a vector α in W such that $\beta - \alpha$ is perpendicular (orthogonal) to W.
9. This allows us to find points on the circle explicitly simply by giving t arbitrary values, which **may be selected** to be rational numbers.
10. Section 5 takes a look at some of the equivalence relations which arise in the book, attempting to indicate how some of the results in the book **might be interpreted** from the point of view of equivalence relations.
11. Sometimes the letters x and y are occupied to denote variables which are not the first and second variables of the function f. In this case, other letters **must be used** if we wish to replace D_1f and D_2f by partial derivatives with respect to these variables.
12. As vectors are used, it is intended that they **should be determined** by their length and direction. Thus one **must identify** two directed line segments if they have the same length and the same direction.

UNIDAD 18 EL GERUNDIO

El gerundio, o participio presente, puede desempeñar otras funciones además de verbo. A continuación, se brinda un resumen de las mismas con sus correspondientes ejemplos.

Verbo

El gerundio es el verbo característico del grupo de tiempos continuos, es decir, los que se forman con la estructura genérica:

BE + Ving.

Ejemplos:

1. For the moment, we are **dealing with** quotients of integers and **describing** how they behave. In the next section we shall deal with multiplicative inverses.
2. All we are **trying** to do here is to get a quick acquaintance with the graphs of simple curves defined by simple equations. This is more than sufficient background to do calculus and many other applications (in physics, engineering, or economics).
3. When you learn about coordinates, then you will see that the simultaneous equations we have been **considering** represent straight lines, and that finding their simultaneous solution gives the coordinates of the point of intersection of these lines.
4. What we are **proving** here is that if a linear function T is invertible, then the inverse T^{-1} is also linear.
5. Since we are **operating** in a three-dimensional space, there can be only one further vector, α_2. It must generate a cyclic subspace of dimension 1, i.e., it must be a characteristic vector for T.

Adjetivo

Cuando desempeña esta función se lo suele denominar adjetivo participial. En tal carácter, ocupa la posición que normalmente le corresponde a un adjetivo en general, es decir, como modificador de un sustantivo.

Ejemplos:

1. In the event that row 1 had a **leading** non-zero entry in column k, this **leading** non-zero entry of row 2 cannot occur in column k; say it occurs in column $k_r \neq k$.
2. The introductory remarks of the previous section provide us with a **starting** point for our attempt to analyze the general linear operator T.
3. Let d be a non-zero polynomial over the field F. If f is in $F[x]$, the **preceding** theorem shows there is at most one polynomial q in $F[x]$ such that $f = dq$.

Sin embargo, en esta circunstancia el gerundio también puede operar como complemento del verbo 'to be' con el significado "ser" y se interpreta al gerundio como adjetivo.

4. It is **interesting** to note that Theorem 5 establishes the uniqueness of the dimension of a (finite-dimensional) vector space.
5. Atoms contain charges in motion, so it should not be **surprising** that magnetic forces cause changes in that motion and in the energy levels.

Sustantivo

Cuando desempeña esta función suele ocupar la posición que normalmente le corresponde a un sustantivo en general, es decir, como sujeto de una oración[(1)], objeto directo o núcleo de una frase sustantiva.

Ejemplos:

1. The **meaning** of Δx is not the product of Δ and x; it is a single symbol that means "the change in the quantity x."
2. If every vector in *V* has an orthogonal projection on *W*, the **mapping** that assigns to each vector in *V* its orthogonal projection on *W* is called the orthogonal projection of *V* on *W*.
3. The trouble here is that there is no quantification of *x*. What one means in that case, is the function whose value at a number *x* is such and such. We shall try to avoid incorrect language at least at the **beginning** of our discussion.
4. Irreversible heat flow increases disorder because the molecules are initially sorted into hotter and cooler regions; this **sorting** is lost when the system comes to thermal equilibrium.
5. Newton, Leibniz, and their contemporaries simply let $h = 0$ and said that $2x_0$ was the slope of the tangent line at P_0. However, this raises the ghost of a 0/0 form in the middle term. True **understanding** of the calculus is in the comprehension of how the introduction of something new (the derivative, i.e., the limit of a difference quotient) resolves this dilemma.

Sujeto de una oración[(1)]

Si bien corresponde a la función de sustantivo, no se interpreta como tal sino como infinitivo. En la escritura, la diferencia radica en que no va acompañado de un determinador.

1. The distance from the earth to the moon is about 384,000,000 m, but **writing** the number in this form does not indicate the number of significant figures.

2. **Writing** programs in machine code is obviously a tedious and error-prone process, since each operation must be specified using a particular numeric instruction code together with the actual addresses of the data to be used.

Complemento del verbo to be

El problema de interpretación radica en que el verbo 'to be' significa "ser" o "estar" y en general se le adjudica esta última acepción. En este caso el verbo "to be" significa "ser" y se interpreta al gerundio como infinitivo.

1. Such a definition is called an operational definition. Two examples are **measuring** a distance by using a ruler and **measuring** a time interval by using a stopwatch.

Objeto de Preposición

Este caso presenta habitualmente dificultades para su reconocimiento y resolución a pesar de constituir una estructura sencilla. Objeto de preposición significa que se encuentra a continuación de una preposición. En este caso se lo interpreta como un infinitivo en castellano. Se observan dos alternativas, a saber:

a) by + Ving: **Se interpreta de la siguiente manera:**

i. directamente como gerundio.
ii. mediante + artículo + sustantivo.
iii. al + infinitivo.

b) preposición + Ving **Se interpreta de la siguiente manera:**

i. preposición + infinitivo

Ejemplos:

1. The following results can be demonstrated by **differentiating** both sides to produce an identity. In each case an arbitrary constant c (which has been omitted here) should be added.
2. It can be shown that an absolutely convergent infinite product converges and that factors can in such cases be rearranged without **affecting** the result.
3. The sum or resultant of vectors A and B of Fig. 7-3(a) below is a vector C formed by **placing** the initial point of B on the terminal point of A and **joining** the initial point of A to the terminal point of B.
4. After **obtaining** a result with logarithms an anti-logarithm procedure is necessary to find its image in the original framework.
5. The first mean value theorem generalizes the idea of **finding** an arithmetic mean (i.e., an average value of a given set of values) to a continuous function over an interval.

Gerundio Relativo

Esta función es la más difícil de identificar y resolver. En este caso, el gerundio siempre se encuentra a continuación de un sustantivo y se interpreta como:

que + verbo en presente o pasado.

Ejemplos:

1. A tridiagonal matrix T is a square matrix in which all of the elements not on the major diagonal and the two diagonals **surrounding** the major diagonal are zero.
2. If some elements of A and B are the same, we count them only once. Then the set of elements **belonging** to A or B (or both) is countable.

3. The group of increments required to fit a polynomial is called an interval. A linear polynomial requires an interval **consisting** of only one increment. A quadratic polynomial requires an interval **containing** two increments. And so on.
4. The significant digits, or figures, in a number are the digits of the number which are known to be correct. Scientific calculations generally begin with a set of data **having** a known number of significant digits.
5. In general, if $w = f(z)$ is a transformation where $f(z)$ is analytic, the angle between two curves in the z plane **intersecting** at $z = z_0$ has the same magnitude and sense (orientation) as the angle between the images of the two curves, so long as $f'(z_0) \neq 0$.

Objeto de Ciertos Verbos

A continuación se brinda una lista de algunos verbos seguidos de gerundio:

• admit	• advise	• allow	• anticipate	• appreciate	• avoid
• begin	• cease	• consider	• delay	• deny	• discuss
• dislike	• encourage	• escape	• excuse	• finish	• involve
• justify	• keep	• like	• mean	• mention	• need
• neglect	• permit	• postpone	• practice	• prefer	• prevent
• propose	• quit	• recall	• recollect	• recommend	• report
• require	• resist	• start	• stop	• suggest	• try

En general, se traduce como infinitivo.

Ejemplos:

1. Suppose that these vectors are independently and identically distributed as $N(\mu, \Sigma)$ where both μ and Σ are unknown. Consider **testing** the hypothesis H_0: $\mu = \mu_0$ versus its alternative H_a: $\mu \neq \mu_0$, where μ_0 is some hypothesized value of μ.
2. That conclusion does not require the linearity nor does it involve **checking** separately that *UT* is 1:1 and onto.
3. Units of measurement are essential ingredients of any coordinate system. In geometry problems one tries to use the same unit of measurement on all axes to avoid **distorting** the shapes of figures.
4. Use the formula in part (b) to generate the sequence of vectors for the choices $p=21$, $x_0=5$ and $x_1=5$ until the sequence starts **repeating**.
5. The elements of a sequence are enumerated in a specific order. A set is a collection of objects, with no specified arrangement or order. Of course, to describe the set we may list its members, and that requires **choosing** an order.