University of Batna2, Department of Mathematics **Handouts N°1**
Module: English
Academic year: 2020/2021
Teacher: Mr. NACER Djamel
Level: Master 2 all specialties (Applied Mathematics, functional analysis and theories of linear operators; Partial differential equations and applications)

➢ Objectives of the courses:

- ✓ **Students will be able to use tenses (Present, past, future);**
- ✓ **Students will be able to use active/ passive voice appropriately;**
- ✓ **Students will be able to write scientifically;**
- ✓ **Students will be able to translate text related to their fields;**
- ✓ **Students will be able to master scientific terms related to their fields.**

➢ Content

- ✓ **Tenses (simple Present, Simple past, and Simple future)**
- ✓ **Active/ Passive voice**
- ✓ **Scientific writing**
- ✓ **Notation**
- ✓ **Scientific terms**
- ✓ **Translation**

1/Tenses:

1/ The Simple Present

The simple present is a verb tense with two main uses. We use the simple present tense when an action is happening right now, or when it happens regularly (or unceasingly, which is why it's sometimes called present indefinite). Depending on the person, the simple present tense is formed by using the **root form** or by adding **-s** or **-es** to the end.

e.g. I **feel** great! Pauline **loves** pie.

I'm sorry to hear that you**'re** sick

The other is to talk about habitual actions or occurrences.

e.g. Pauline **practices** the piano every day.

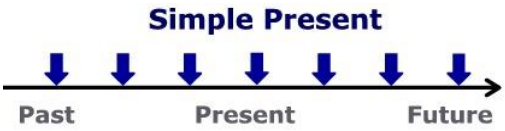
Ms. Jackson **travels** during the summer.

Hamsters **run** all night.

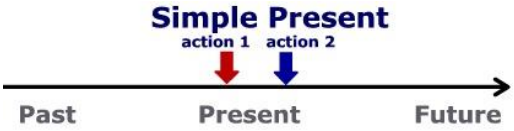
When do we use the *Simple Present*?

A diagram to visualize the *Simple Present*

1. We use the *Simple Present* when we talk about something which happens repeatedly.



2. We use the *Simple Present* to describe a series of actions in the present.



1. Repeated actions *(every day, always, often, sometimes, never)*

My friend often **draws** nice posters.

I never **drink** orange juice.

We usually **go** to the Baltic Sea in summer.

2. Things in general

The sun **rises** in the east.

Cats **drink** milk.

3. Fixed arrangements, scheduled events (e.g. timetable)

The plane **flies** to London every Monday.

We **have** English on Tuesdays and Fridays.

4. Sequence of actions in the present *(first – then, after that)*

First I **get** up, then I **have** breakfast.

After school, I **switch** on my computer, then I **check** my emails and after that I **play** my favourite game.

5. Instructions

Open your books at page 34.

Don't shout at me!

6. with special verbs – which are normally not used with the *Present Progressive* (These verbs express states, possessions, feelings etc.) *be, believe, belong, hate, hear, like, love, mean, prefer, remain, realize, see, seem, smell, think, understand, want, wish*

I **understand** English.

He **doesn't like** fish.

She **believes** in life after death.

Do you **prefer** tea or coffee?

What are signal words for the *Simple Present*?

These words tell you what tense you have to use. For the *Simple Present* these are adverbs of frequency:

- **always**
- **often**
- **usually**
- **sometimes**
- **seldom**
- **never**

Other phrases of time can occur, like:

- **every day**
- **every week**
- **every year**
- **on Mondays**
- **after school**

*Typically, when we want to describe a temporary action that is currently in progress, we use the **present continuous**: Pauline can't come to the phone right now because she **is brushing** her teeth.

Remark!

For a few verbs, the third-person singular ends with **-es** instead of **-s**. Typically, these are verbs whose root form ends in **o, ch, sh, th, ss, gh,** or **z**

First-person singular: ***I*** *go*

Second-person singular: ***You*** *go*

Third-person singular: ***He/she/it*** *goes* (note the -es)

First-person plural: ***We*** *go*

Second-person plural: ***You*** *go*

Third-person plural: ***They*** *go*

How to add -s to the infintive in the *Simple Present*

- I **watch** → he **watch**es
- I **pass** → he **pass**es
- I **go** → he **go**es
- I **do** → he **do**es

2. Verbs ending in *-y*

Mind the letter that stands before *-y*.

Vowel before *-y*: Add *-s*.

- I **pl**a**y** → he **pl**a**y**s

Consonant before *-y*: Change *-y* to *-i*. Then add *-es*.

- I **hur**r**y** → he **hur**r**i**es

* For most regular verbs, you put the negation of the verb before the verb, e.g. “She won’t go” or “I don’t smell anything.”

The verb **to be** is irregular:

First-person singular: *I am*

Second-person singular: *You are*

Third-person singular: *He/she/it is*

First-person plural: *We are*

Second-person plural: *You are*

Third-person plural: *They are*

For more information about irregular verbs, visit the following site: https://www.englishpage.com/irregularverbs/irregularverbs.html

How to Make the Simple Present Negative

The formula for making a simple present verb negative is **Subject** (or what replaces it) + **do/does + not + [root "base" form of verb]**. You can also use the contraction **don't** or **doesn't** instead of **do not** or **does not**.

e.g. Pauline **does not want** to share the pie. She **doesn't think** there is enough to go around. Her friends do not agree. I **don't want** pie anyway.

To make the verb **to be** negative, the formula is **[to be] + not**.

e.g. I **am not** a pie lover, but Pauline sure is. You **aren't** ready for such delicious pie.

How to Ask a Question

The formula for asking a question in the simple present is **do/does + [subject] + [root form of verb]**.

e.g. **Do you know** how to bake a pie? How much **does** Pauline love pie?

Common Verbs in the Simple Present

Infinitive	I, You, We, They	He, She, It
to ask	ask / do not ask	asks / does not ask
to work	work / do not work	works / does not work
to call	call / do not call	calls / does not call
to use	use / do not use	uses / does not use
to have	have / do not have	has / does not have

1. *be* as a main verb

Pronouns	Affirmative sentence	Negative sentence	Question
I	I **am** from Britain.	I **am not** from Britain.	**Am** I from Britain?
you	You **are** from Britain.	You **are not** from Britain.	**Are** you from Britain?
he, she, it	He **is** from Britain.	He **is not** from Britain.	**Is** he from Britain?
we, you, they	They **are** from Britain.	They **are not** from Britain.	**Are** they from Britain?

2. *do* as a main verb

Pronouns	Affirmative sentence	Negative sentence	Question
I	I do exercises.	I do not do exercises.	Do I do exercises?
you	You do exercises.	You do not do exercises.	Do you do exercises?
he, she, it	He does exercises.	He does not do exercises.	Does he do exercises?
we, you, they	They do exercises.	They do not do exercises.	Do they do exercises?

3. *have* as a main verb

Pronouns	Affirmative sentence	Negative sentence	Question
I	I have books.	I do not have books.	Do I have books?
you	You have books.	You do not have books.	Do you have books?
he, she, it	He has books.	He does not have books.	Does he have books?
we, you, they	They have books.	They do not have books.	Do they have books?

4. Modals *can*, *could*, *may*, *must*, *need*, *will* etc.

Pronouns	Affirmative sentence	Negative sentence	Question
I, he, she, it, we, you, they	I can play tennis.	I cannot play tennis.	Can I play tennis?

Exercise 1: Complete the sentences with the Present Simple form of the verb in brackets.

1. Mum ..... (wash) the car once a week.
2. Every year Helen ..... (go) to France.
3. Children usually ..... (like) ice cream.
4. He ..... (not visit) his friends every to the lake? day.
5. Bob ..... (study) French on Saturdays.

Exercise 2: Fill in the spaces with the correct form of the verb in simple present tense

1) I (be) _____ sixteen years old.

2) Tommy (live) _____ at 107 Pine Lane.

3) Juana (cook) _____ dinner for her family.

4) They (eat) _____ lunch at 12:00.

5) Nina (take) _____ medicine when she is sick.

6) I (like) _____ chocolate.

7) He (drive) _____ a nice car.

8) We (want) _____ to see a movie tonight.

9) Mr. Anderson (teach) _____ chemistry at Hill High School.

10) They (study) _____ English at school.

11) I (want) _____ to go home now.

12) Bill and Calicia (drive) _____ to the mountains every year.

13) We (eat) _____ pasta once a week.

14) It (snow) _____ here in December.

15) When Dax (take) _____ a shower, he (wash) _____ his hair with shampoo.

* For more activities about the simple presents visit this link:
https://www.filepicker.io/api/file/8mNdeR7BQW6ITkImSOlX?ck_subscriber_id=211729683

2/ The simple past

- **The** simple past **is a verb tense that is used to talk about things that happened or existed before now.**

  e.g. The teacher **explained** the lesson yesterday**.**

- The simple past tense shows that you are talking about something that has already happened. Unlike the past continuous tense, which is used to talk about past events that happened over a period of time, the simple past tense emphasizes that the action is finished.

  e.g. Mohammed **admired** the way the light **glinted** off his silver medal.

- You can also use the simple past to talk about a past state of being, such as the way someone felt about something. This is often expressed with the simple past tense of the verb to be and an adjective, noun, or prepositional phrase.

  e.g. Mohammed **was** proud of his wonderful victory.

Use of the *Simple Past*

A diagram to visualize the *Simple Past*

1. We use the *Simple Past* when we talk about something which started and finished in the past.

2. We use the *Simple Past* to describe a series of actions in the past.

1. Actions finished in the past

    e.g. I **visited** Berlin last week.

2. Series of completed actions in the past

    e.g. First I **got** up, then I **had** breakfast.

What are signal words for the *Simple Past*?

yesterday

last week

a month ago

in 2010

How to Formulate the Simple Past

- For regular verbs, add **-ed** to the root form of the verb (or just **-d** if the root form already ends in an e):

Play→Play**ed** Type→Type**d** Listen→Listened Push→Pushed Love→Loved

- For **irregular verbs**, things get more complicated. The simple past tense of some irregular verbs looks exactly like the root form:

Put→Put Cut→Cut Set→Set Cost→Cost Hit→Hit

- For other irregular verbs, including the verb **to be**, the simple past forms are more erratic:

See→Saw Build→Built Go→Went Do→Did Rise→Rose Am/Is/Are→Was/Were

More Examples:

- Affirmative sentences in the *Simple Past* – regular verbs

  I **cleaned** my room.

  You **cleaned** your room.

  He **cleaned** his room.

- Affirmative sentences in the *Simple Past* – irregular verbs

  I **went** home.

  You **went** home.

  He **went** home.

How to Make the Simple Past Negative

Fortunately, there is a formula for making simple past verbs negative, and it's the same for both regular and irregular verbs (except for the verb **to be**). The formula is **did not + [root form of verb]**. You can also use the contraction **didn't** instead of **did not**.

e.g. He **did not** go to the school.

- For the verb **to be**, you don't need the auxiliary *did*. When the subject of the sentence is singular, use **was not** or **wasn't**. When the subject is plural, use **were not** or **weren't**

e.g. He **was not** sad. They **were not** active

Questions in the *Simple Past*

You need the auxiliary **did** and the **infinitive** of the verb.

→ **did + [subject] + [root form of verb].**

e.g. **Did** I **play** football?

Did you **play** football?

Did he **play** footballs?

When asking a question with the verb **to be**, you **don't need the auxiliary *did***. The formula is: **was/were + [subject]**.

e.g. **Was** Ridha in a good mood after the contest? **Were** people taking lots of pictures?

Common Regular Verbs in the Past Tense

Infinitive	Past Tense	Negative
to ask	asked	did not ask
to work	worked	did not work
to call	called	did not call
to use	used	did not use

Common Irregular Verbs in the Past Tense

Infinitive	Past Tense	Negative
to be	was were	was not were not
to have	had	did not have
to do	did	did not do
to say	said	did not say
to get	got	did not get
to make	made	did not make
to go	went	did not go
to take	took	did not take
to see	saw	did not see
to come	came	did not come

- **Spelling Remark: Adding *-ed***

1. Consonant after a short, stressed vowel at the end of the word

Double the consonant.

stop – **stopped**
swap – **swapped**

We do not double the consonant if the vowel is not stressed: **benefit** – **benefited** (Here we stress the first *e*, not the *i*.)

In Britsh English we double one *-l* at the end of the word:
travel – **travelled**

2. One *-e* at the end of the word

Only add *-d*.

love – **loved**

save – **saved**

3. Verbs ending in *-y*

Change **-y** to **-i** after a **consonant**. Then add **-ed**.

wor**r**y – wor**r**i**ed**

Add **-ed** with verbs ending in **-y** preceded by a **vowel** *(a, e, i, o, u)*:

pl**a**y – pl**a**y**ed**

Exercise 1

Complete these sentences in the **PAST TENSE**, using the correct verb: * play * enjoy * watch * listen * talk * phone * stop * walk * travel * like * stay

e.g. I watch**ed** the late film on TV last night.

1. We really …….. the concert last night. It was great!

2. She …… with friends in Brighton last summer.

3. Italy …… very well in the last World Cup.

4. Her parents …….. by train from Shanghai to Moscow.

5. I …….. you four times last night but you were out.

6. We ……. along the beach yesterday. It was lovely.

7. She ……. the film but she didn't like the music.

8. The men …….. work at exactly one o'clock.

9. I ……. to the new Sting album yesterday. It's great.

10. They …… to us about their trip to Madagaskar. It was very interesting.

Exercise 2

Make questions using WAS / WERE:

1. Jim / at home / last night. Was Jim at home last night?

2. You / at school / on Monday……..……?

3. David / here / yesterday. ……..…….. ?

4. the cinema / open / on Sunday. …….. ?
5. Kate and Jane / late / yesterday.…….…….. ?
6. you / in the football team / last year. …….. ?
7. All your friends / at your party…….. ?
8. it / hot / last week. …….……. ?

3/ The Simple Future

The simple future is a verb tense that is used to talk about things that **haven't happened yet**.

e.g. This year, Jen **will read** *War and Peace*. It **will be** hard, but she is determined to do it.

We use the simple future to talk about an action or condition that will begin and end in the future.

How to Form the Simple Future

The formula for the simple future is **will + [root form of verb]**.

e.g. I **will learn** a new language.

Jen **will read** that book.

My brothers **will sleep** till noon if no one wakes them up.

You **will see** what I mean.

N.B. It doesn't matter if the subject is singular or plural; the formula for the simple future doesn't change.

But…

There is another way to show that something will happen in the future. It follows the formula **[am/is/are] + going to + [root form verb]**.

e.g. I **am going to learn** a new language. Jen **is going to read** that book. My brothers **are going to sleep** till noon if no one wakes them up. You **are going to see** what I mean.

- The "going to" construction is common in speech and casual writing. Keep in mind though that it's on the informal side, so it's a good idea to stick to the **will + [root form]** construction in formal writing.

1. Use of the *will-future*

1. future actions happen without the speaker's intention

   The sun **will shine** tomorrow.

2. predictions, assumptions

   I think Sue **will arrive** in Paris at 6 pm.

3. spontaneous actions

   Hang on! I**'ll have** a word with you.

2. Use of the *going to-future*

1. planned actions in the future

   We **are** going to **sing** at the party.

2. You are certain that sth. is going to happen in the future (logical consequence).

   Look at that car! It **is** going to **crash** into the yellow one.

A diagram to visualize *going to-future* and *will-future*

Both tenses are future tenses.

We use the *will-future* for predictions, assumptions, promises and when we do something spontaneously.

We use the *going to-future* with planned actions.

How to Make the Simple Future Negative

To make the simple future negative, the formula is **will + not + [root form]**.

e.g. Jen **will not quit** before she reaches her goal.

Make sure you arrive on time tomorrow because the bus **will not wait** for you.

He **will not say** anything bad about his boss.

I **will not finish** my homework in time for class.

- Using the **"going to"** construction, the formula is **[am/is/are] + not + going to + [root form]**.

e.g. Jen **is not going to quit** before she reaches her goal.

Make sure you arrive on time tomorrow because the bus **is not going to wait** for you.

He **is not going to say** anything bad about his boss.

I **am not going to finish** my homework in time for class.

How to Ask a Question

- To ask a question in the simple future, the formula is **will + [subject] + [root form]**.

e.g. Will Jen finish *War and Peace* over the summer?

Will I have the discipline to study Spanish every day?

What **will you buy** with the money you found?

- The formula for the **"going to"** construction is **[am/is/are] + [subject] +going to + [root form]**.

e.g. Is Jen going to finish *War and Peace* over the summer?

Am I going to have the discipline to study Spanish every day?

What **are you going to buy** with the money you found?

Common Verbs in the Simple Future

Infinitive	Simple Future	Negative
to be	will be	will not be
to ask	will ask	will not ask
to work	will work	will not work
to call	will call	will not call
to use	will use	will not use
to have	will have	will not have

- The **"Going to"** Construction

Infinitive	I	You, We, They	He, She, It
to be	am going to be am not going to be	are going to be are not going to be	is going to be is not going to be
to ask	am going to ask am not going to ask	are going to ask are not going to ask	is going to ask is not going to ask

Exercise: Put the verbs into the correct form (future I simple). Use will.

Jim asked a fortune teller about his future. Here is what she told him:

1. You (earn) will earn a lot of money.
2. You (travel) _____ around the world.

3. You (meet) _____ lots of interesting people.
4. Everybody (adore) _____ you.
5. You (not / have) _____ any problems.
6. Many people (serve) _____ you.
7. They (anticipate) _____ your wishes.
8. There (not / be) _____ anything left to wish for.
9. Everything (be) _____ perfect.
10. But all these things (happen / only) _____ if you marry me.

Exercise: Write the correct form of the simple future tense using **"going to".**

1) Jess and Billy _____ to be roommates.

2) It _____ to be sunny today.

3) Yuki _____ to come to the movie with us.

4) Our family _____ to move to Alaska.

5) This weekend we _____ to study for the Spanish test on Monday.

6) They _____ probably _____ to run four miles.

7) It is doubtful that the sailors _____ ever _____ to return from their journey to Antarctica.

- For more activities about the future visit this link https://agendaweb.org/verbs/future-will-exercises.html

2/ Active and passive voice:

When to use passive voice

There are sometimes good reasons to use the passive voice.

- TO EMPHASIZE THE ACTION RATHER THAN THE ACTOR

After long debate, the proposal was endorsed by the long-range planning committee.

- TO KEEP THE SUBJECT AND FOCUS CONSISTENT THROUGHOUT A PASSAGE

The data processing department recently presented what proved to be a controversial proposal to expand its staff. After long debate, the proposal was endorsed by . . . .

- TO BE TACTFUL BY NOT NAMING THE ACTOR

The procedures were somehow misinterpreted.

- TO DESCRIBE A CONDITION IN WHICH THE ACTOR IS UNKNOWN OR UNIMPORTANT

Every year, thousands of people are diagnosed as having cancer.

- TO CREATE AN AUTHORITATIVE TONE

Visitors are not allowed after 9:00 p.m.

In the active voice, the subject of the sentence DOES the action:

Jake wrote a letter.

subject / verb / object

Notice that the **object** of the active sentence (letter) became the **subject** of the passive sentence.

If we want, we can include "by Jake" to say who did the action.

➢ **We do not include "by..." when:**

- The doer of the action is **unknown**: The money was stolen.
- The doer of the action is **"people in general"**: Black cats are believed to bring bad luck.
- The doer of the action is **completely unimportant**: This bridge was built in 1889. (probably by a construction company)

Tense	**Active / Passive**	**When to use it?**
Simple Present	Factory workers **test** the products.	General procedures & processes; general thoughts & opinions
	The products **are tested.**	
Simple past	An interior design company **renovated** our facilities last month.	Actions completed at a specific time in the past.
	Our facilities **were renovated** last month.	
Simple future	Everyone **will exchange** gifts at Christmas. The company **is going to implement** the policy next month.	Actions to be completed in the future
	Gifts **will be exchanged** at Christmas. The policy **is going to be implemented** next month.	

Passive – Form

To **be** + **past participle**

How to form a passive sentence when an active sentence is given:

- **object** of the *active* sentence becomes **subject** in the *passive* sentence
- **subject** of the *active* sentence becomes **object** in the *passive* sentence (or is left out)

We can only form a passive sentence from an active sentence when there is an **object** in the active sentence.

Type of sentence	Subject	Verb	Object
Active sentence:	Peter	builds	a house.
			
Passive sentence:	A house	is built	by Peter.

Examples

1. Simple Present

Type of sentence	Subject	Verb	Object
Active sentence:	Peter	builds	a house.
			
Passive sentence:	A house	is built	by Peter.

2. Simple Past

Type of sentence	Subject	Verb	Object
Active sentence:	Peter	built	a house.
			
Passive sentence:	A house	was built	by Peter.

3. will-future

Type of sentence	Subject	Verb	Object
Active sentence:	Peter	will build	a house.
			
Passive sentence:	A house	will be built	by Peter.

4. Modals

Type of sentence	Subject	Verb	Object
Active sentence:	Peter	can build	a house.
			
Passive sentence:	A house	can be built	by Peter.

Exercises

A - Are the sentences written in Active or Passive?

1) Steven likes to play baseball.
a) Active
b) Passive

2) Bingo is played in Britain.
a) Active
b) Passive

3) He lost his keys yesterday.
a) Active
b) Passive

4) A letter was written.
a) Active
b) Passive

5) They are listening to their music.
a) Active
b) Passive

6) They often read e-mails.
a) Active
b) Passive

7) These cars are produced in Italy.
a) Active
b) Passive

8) French is spoken in Niger.
a) Active
b) Passive

9) Lots of houses were destroyed.
a) Active
b) Passive

10) The bus driver was hurt.
a) Active
b) Passive

B - Make Passive forms from the given phrases. Mind the tenses in brackets.

1) English - to speak (Simple Present) _____
2) films - to watch (Simple Present) _____
3) posters - to make (Simple Present) _____
4) stories - to tell (Simple Present) _____
5) computer games - to buy (Simple Present) _____
6) books - to write (Simple Past) _____
7) volleyball - to play (Simple Past) _____
8) songs - to sing (Simple Past) _____
9) skateboards - to ride (Simple Past) _____
10) a prize - to win (Simple Past) _____

C - Rewrite the Active sentences into Passive.

1) They understand Spanish.

_____

2) My friend bought a new car.

_____

3) John cleaned the bathroom.

_____

4) The teacher closes the window.

_____

5) The girls can play handball.

_____

6) Our dog did not bite the cat.

_____

7) The mechanic repairs cars.

_____

8) The electricians test the fire alarm.

_____

9) Levi Strauss invented the blue jeans.

_____

10) Frank takes photos.

_____

Summary of tenses:

Tense	Signal words	Use	Form	Examples affirmative	Examples negative	Examples interrogative
Simple Present	every day sometimes always often usually seldom never first ... then	• something happens repeatedly • how often something happens • one action follows another • things in general • with verbs like (*to love, to hate, to think, etc.*) • future meaning: timetables, programmes	infinitive he/she/it: infinitive + s	I work. He works. I go. He goes.	I don't work. He doesn't work. I don't go. He doesn't go.	Do I work? Does he work? Do I go? Does he go?
Simple Past	last ... ... ago in 1990 yesterday	action took place in the past, mostly connected with an expression of time (no connection to the present)	regular: infinitive + ed irregular: (2nd column of table of irregular verbs)	I worked. He worked. I went. He went.	I didn't work. He didn't work. I didn't go. He didn't go.	Did I work? Did he work? Did I go? Did he go?
will - future		• predictions about the future (you think that sth will happen) • you decide to do sth. spontaneously at the time of speaking • main clause in type I of the Conditional sentences	will + infinitive	I'll work. He'll work. I'll go. He'll go.	I won't work. He won't work. I won't go. He won't go.	Will I work? Will he work? Will I go? Will he go?
going to - future		• when you have already decided to do sth. in the future • what you think what will happen	be (am/are/is) + *going to* + infinitive	I'm *going to* work. He's *going to* work. I'm *going to* go. He's *going to* go.	I'm not *going to* work. He's not *going to* work. I'm not *going to* go. He's not *going to* go.	Am I *going to* work? Is he *going to* work? Am I *going to* go? Is he *going to* go?

3/Notations

Arithmetic

Integers

0	zero	10	ten	20	twenty
1	one	11	eleven	30	thirty
2	two	12	twelve	40	forty
3	three	13	thirteen	50	fifty
4	four	14	fourteen	60	sixty
5	five	15	fifteen	70	seventy
6	six	16	sixteen	80	eighty
7	seven	17	seventeen	90	ninety
8	eight	18	eighteen	100	one hundred
9	nine	19	nineteen	1000	one thousand

−245	minus two hundred and forty-five
22 731	twenty-two thousand seven hundred and thirty-one
1 000 000	one million
56 000 000	fifty-six million
1 000 000 000	one billion [US usage, now universal]
7 000 000 000	seven billion [US usage, now universal]
1 000 000 000 000	one trillion [US usage, now universal]
3 000 000 000 000	three trillion [US usage, now universal]

Fractions [= Rational Numbers]

$\frac{1}{2}$	one half	$\frac{3}{8}$	three eighths
$\frac{1}{3}$	one third	$\frac{26}{9}$	twenty-six ninths
$\frac{1}{4}$	one quarter [= one fourth]	$-\frac{5}{34}$	minus five thirty-fourths
$\frac{1}{5}$	one fifth	$2\frac{3}{7}$	two and three sevenths
$-\frac{1}{17}$	minus one seventeenth		

Real Numbers

-0.067	minus nought point zero six seven
81.59	eighty-one point five nine
$-2.3 \cdot 10^6$	minus two point three times ten to the six
$[= -2\ 300\ 000$	minus two million three hundred thousand]
$4 \cdot 10^{-3}$	four times ten to the minus three
$[= 0.004 = 4/1000$	four thousandths]
$\pi\ [= 3.14159\ldots]$	pi [pronounced as 'pie']
$e\ [= 2.71828\ldots]$	e [base of the natural logarithm]

Complex Numbers

i	i
$3 + 4i$	three plus four i
$1 - 2i$	one minus two i
$\overline{1 - 2i} = 1 + 2i$	the complex conjugate of one minus two i equals one plus two i

The real part and the imaginary part of $3 + 4i$ are equal, respectively, to 3 and 4.

Basic arithmetic operations

Addition:	$3 + 5 = 8$	three plus five equals [= is equal to] eight
Subtraction:	$3 - 5 = -2$	three minus five equals [= ...] minus two
Multiplication:	$3 \cdot 5 = 15$	three times five equals [= ...] fifteen
Division:	$3/5 = 0.6$	three divided by five equals [= ...] zero point six

$(2 - 3) \cdot 6 + 1 = -5$	two minus three in brackets times six plus one equals minus five
$\frac{1-3}{2+4} = -1/3$	one minus three over two plus four equals minus one third
$4!\ [= 1 \cdot 2 \cdot 3 \cdot 4]$	four factorial

Exponentiation, Roots

5^2	$[= 5 \cdot 5 = 25]$	five squared
5^3	$[= 5 \cdot 5 \cdot 5 = 125]$	five cubed
5^4	$[= 5 \cdot 5 \cdot 5 \cdot 5 = 625]$	five to the (power of) four
5^{-1}	$[= 1/5 = 0.2]$	five to the minus one
5^{-2}	$[= 1/5^2 = 0.04]$	five to the minus two
$\sqrt{3}$	$[= 1.73205\ldots]$	the square root of three
$\sqrt[3]{64}$	$[= 4]$	the cube root of sixty four
$\sqrt[5]{32}$	$[= 2]$	the fifth root of thirty two

In the complex domain the notation $\sqrt[n]{a}$ is ambiguous, since any non-zero complex number has n different n-th roots. For example, $\sqrt[4]{-4}$ has four possible values: $\pm 1 \pm i$ (with all possible combinations of signs).

$(1+2)^{2+2}$	one plus two, all to the power of two plus two
$e^{\pi i} = -1$	e to the (power of) pi i equals minus one

Divisibility

The multiples of a positive integer a are the numbers $a, 2a, 3a, 4a, \ldots$. If b is a multiple of a, we also say that a divides b, or that a is a divisor of b (notation: $a \mid b$). This is equivalent to $\frac{b}{a}$ being an integer.

Inequalities

$x > y$	x is greater than y
$x \geq y$	x is greater (than) or equal to y
$x < y$	x is smaller than y
$x \leq y$	x is smaller (than) or equal to y
$x > 0$	x is positive
$x \geq 0$	x is positive or zero; x is non-negative
$x < 0$	x is negative
$x \leq 0$	x is negative or zero

Derivatives

f'	f dash; f prime; the first derivative of f

f''	f double dash; f double prime; the second derivative of f
$f^{(3)}$	the third derivative of f
$f^{(n)}$	the n-th derivative of f
$\frac{dy}{dx}$	d y by d x; the derivative of y by x
$\frac{d^2y}{dx^2}$	the second derivative of y by x; d squared y by d x squared
$\frac{\partial f}{\partial x}$	the partial derivative of f by x (with respect to x); partial d f by d x
$\frac{\partial^2 f}{\partial x^2}$	the second partial derivative of f by x (with respect to x)
	partial d squared f by d x squared
∇f	nabla f; the gradient of f
Δf	delta f

4/ Scientific Terms

For you to do!

- **Relying on your specialized dictionary or the internet, search for the meaning of these terms and link them with their appropriate definition.**

A Key terms

Match these terms with their definitions.

1. notation	a) not representing any specific value
2. arbitrary	b) having all sides of equal length
3. equilateral	c) any series of signs or symbols used to represent quantities or elements in a specialized system
4. a solid	d) a solid figure having four plane faces
5. tetrahedron	e) a solid figure having eight plane faces
6. octahedron	f) a closed surface in three-dimensional space
7. vertex (pl.vertices)	g) the point of intersection of two sides of a plane figure or angle
8. an obtuse angle	h) (of a triangle) having two sides of equal length
9 .an isosceles triangle	j) (of an angle) lying between 90° and 180°

Match these terms with their definitions.

1. multiple	a) any real number that cannot be expressed as the ratio of two integers
2. fraction	b) the product of a given number or polynomial and any other one
3. an irrational number	c) a ratio of two expressions or numbers other than zero
4. a rational number	d) a quotient of two numbers or quantities
5. ratio	e) any real number of the form a/b, where a and b are integers and b is not zero
6. segment	f) one of the products arising from the multiplication of two or more quantities by the same number or quality
7. equimultiple	g) a part of a line or curve between two points

Match these terms with their definitions.

1. chord	a) a section of a curve, graph, or geometric figure
2. arc	b) a straight line connecting two points on a curve or curved surface
3. angle	c) the space between two straight lines that diverge from a common point or between two planes that extend from a common line
4. trigonometry)	d) the branch of mathematics concerned with the properties of trigonometric functions and their application to the determination of the angles and sides of triangles. Used in surveying and navigation
5. sine	e) a trigonometric function that in a right-angled triangle is the ratio of the length of the opposite side to that of the hypotenuse

Match these terms with their definitions.

1. geometric progression	a) any rational number that can be expressed as the sum or difference of a finite number of units
2. product	b) (also called: exponent, index) a number or variable placed as a superscript to the right of another number or quantity indicating the number of times the number or quantity is to be multiplied by itself
3. integer	c) the result of the multiplication of two or more numbers, quantities etc.
4. power	d) a sequence of numbers, each of which differs from the succeeding one by a constant ratio
5. logarithm	e) the exponent indicating the power to which a fixed number, the base, must be raised to obtain a given number or variable

Match these terms with their definitions.

1. prime number — a) a number or quantity to be divided into another number or quantity (the dividend)
2. composite number — b) a number assigned to a quantity and used as a basis of comparison for the measurement of similar quantities
3. magnitude — c) an integer that cannot be factorized into other integers but is only divisible by itself or 1
4. divisor — d) a positive integer that can be factorized into two or more other positive integers
5. factorization — e) one of two or more integers or polynomials whose product is a given integer or polynomial
6. factor — f) the decomposition of an object (for example, a number, a polynomial, or a matrix) into a product of other objects, or factors, which when multiplied together give the original
7. Pythagorean triple — g) a set of positive integers a, b and c that fits the rule: $a^2 + b^2 = c^2$.

Match these terms with their definitions.

1. ordinary differential equation — a) an equation that refers to an unknown function y of two or more variables, such as f(x,y,t) where x and y are coordinates in the plane and t is time
2. partial differential equation — b) the branch of applied science that concerned with the movement of liquids and gases
3. fluid dynamics — c) an equation that refers to an unknown function y of a single variable x and relates various derivatives of y, such as dy/dx and d2y/dx2
4. wave equation) — d) to determine the value of (the root of a number)
5. to extract — e) having a constant property
6. homogeneous — f) a second-order linear partial equation for the description of waves

Match these terms with their definitions.

1. tangent)	a)calculus that concerns accumulation of quantities and the areas under and between curves
2. velocity	b) calculus that deals with the study of the rates at which quantities change
3. integral calculus	c) a geometric line, curve, plane, or curved surface that touches another curve or surface at one point but does not intersect it
4. differential calculus	d) a measure of the rate of motion of a body expressed as the rate of change of its position in a particular direction with time
5. curve	e) the change of a function, f(x), with respect to an infinitesimally small change in the independent variable
6. derivative	f) the graph of a function with one independent variable
7. volume	g) the extent of a two-dimensional surface enclosed within a specified boundary or geometric figure
8. area	h) the rate of change of velocity
9. acceleration	i) the magnitude of the three-dimensional space enclosed within or occupied by an object, geometric solid, etc
10. function	j) a relation between a set of inputs and a set of permissible outputs with the property that each input is related to exactly one output

Best Wishes