

International Indian School Dammam



STUDY MATERIAL FOR TALENT SEARCH EXAM 2024-25 (Class: VII)



SYLLABUS @ A GLANCE

1. 40% of the questions will be from the given portions including study material.
2. 60% of the question will be general related to the subject.

Talent Search Examination Portion: 2024 – 25

SUBJECT	WEIGHTAGE	CLASS VII
ENGLISH	15	Active and Passive Voice, Subject Verb Agreement, Tenses (Present and Past Tense- Simple, Continuous, Perfect), Reported Speech (Declaratives and Interrogatives), Participles, Infinitives and Gerunds, Coordinating and Subordinating Conjunctions, Books, Authors, Literature Awards (From the given list)
MATHS	25	General Concept- Mental Mathematics, Logical Reasoning, Odd One Out, Geometrical Concept Syllabus based on - 1. Lines and angles, 2. Integers, 3. Comparing quantities, 4. Rational Numbers
SCIENCE & TECHNOLOGY	25	L- 6 Respiration in Organisms, L- 7 Transportation in Animals and Plants, L- 8 Reproduction in Plants, L- 9 Motion and Time, L-11 Light, General questions from Science & Technology and from the uploaded study material.
SOCIAL SC.	15	<u>HISTORY</u> - Ch - 10: 18th Century Political Formations, Ch - 7: Tribes, Nomads and Settled Communities <u>GEOGRAPHY</u> - Ch - 8: Human Environment Interactions, Ch - 9: Life in the Deserts <u>CIVICS</u> - Ch - 6: Understanding Media, Ch - 7: Markets Around Us, Ch - 8: A Shirt in the Market <u>General Questions & Grade 7 Syllabus</u> - TSE will include questions based on topics covered in grade 7 SS, TSE study material and General questions related to history, geography and Civics.
GK / CURRENT AFFAIRS	20	Nobel Prizes, Space Missions, Mount Everest Climbing Records, Natural Disasters, Books and Authors, National Film Awards, International Film Festival of India, Sports Events, National sports Awards, who is who, important days, Current Affairs, and from the uploaded Study Material

SUBJECT: ENGLISH

1.Active and Passive Voice

Active Voice

The subject **does** the action. Formula: ☞ **Subject + Verb + Object**

Example: The **cat** (subject) **chased** (verb) **the mouse** (object).

Passive Voice The subject receives the action.

Formula: ☞ **Object + Helping Verb + Past Participle + by Subject**

Example: **The mouse** (object) **was chased** (helping verb + past participle) **by the cat** (subject).

How to Change Active into Passive Voice?

1. Identify the Verb

Look for the action verb in the sentence. This is the word that shows what is happening.

2. Find the Direct Object

- Ask "What?" or "Whom?" after the verb.
- The answer to this question is the direct object.
- The direct object receives the action of the verb.

3. Find the Indirect Object

- If there's another noun or pronoun between the verb and the direct object, it's often the indirect object.
- Ask "To whom?" or "For whom?", after the verb.
- The indirect object tells to or for whom/what the action is done.

Example: She gave her brother a gift.

- **Verb:** gave
- **Direct Object:** a gift (What did she give?)
- **Indirect Object:** her brother (To whom did she give the gift?)

2. Move the Object to the Subject's Place.

Active: The chef cooks a delicious meal. Passive: A delicious meal is cooked by the chef.

3. Use the Correct Form of "Be" + Past Participle

Active verb = cooks → Passive = is cooked

4. Add "by" (sometimes optional):

The subject of the active sentence becomes the "doer" introduced with "by."

Key Points to Remember:

- The object of the active sentence becomes the subject of the passive sentence.
- Always use the correct form of the verb " **be**" followed by the **past participle (V3)**.
- The doer of the action (optional) is introduced with "by."

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Active to Passive Voice Conversion Chart

Tense	Active Voice	Passive Voice	Formula
Present Simple	She writes a letter.	A letter is written by her.	am/is/are + past participle
Past Simple	He painted the wall.	The wall was painted by him.	was/were + past participle
Future Simple	They will finish the project.	The project will be finished by them.	will be + past participle
Present Continuous	She is reading a book.	A book is being read by her.	am/is/are + being + past participle
Past Continuous	He was repairing the car.	The car was being repaired by him.	was/were + being + past participle
Present Perfect	They have completed the assignment.	The assignment has been completed by them.	has/have + been + past participle
Past Perfect	She had baked a cake.	A cake had been baked by her.	had + been + past participle
Future Perfect	He will have solved the problem.	The problem will have been solved by him.	will have been + past participle
Modals	They can fix the machine.	The machine can be fixed by them.	modal + be + past participle

EXAMPLES

ACTIVE	PASSIVE
The teacher explains the lesson	The lesson is explained by the teacher.
He sings a song	A song is sung by him.
The boy kicked the ball.	The ball was kicked by the boy.
They watched a movie	A movie was watched by them
She will deliver the package.	The package will be delivered by her.
We will complete the assignment tomorrow.	The assignment will be completed by us tomorrow
The workers are repairing the road.	The road is being repaired by the workers
She is writing a story.	A story is being written by her.
He has washed the car	The car has been washed by him.

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They have built a new house.	A new house has been built by them
She had completed the exam	The exam had been completed by her.
They had repaired the bike.	The bike had been repaired by them.

2. Subject-Verb Agreement:

☞ The subject and verb in a sentence must agree in number (singular or plural).

If the subject is singular, the verb must be singular.

If the subject is plural, the verb must be plural.

Rules of Subject-Verb Agreement

1. Singular Subjects = Singular Verbs Eg: **The cat runs** fast

2. Plural Subjects = Plural Verbs Eg: **They play** in the park

3. Subjects Joined by "And" = Plural Verb

- Tom and Jerry **are** best friends.
- The teacher and the principal **have** arrived.

Exception: If two things refer to one idea, use a singular verb.

- Bread and butter *is my favorite breakfast.*
- **Slow and steady wins the race.**
- **His love for music and sports is strong** (even though there are two interests, the subject love refers to one person).

4. Subjects Joined by either.... or / neither nor"- the verb should agree with the noun or pronoun that comes just before it.

- Either the dog or the cats **are** playing outside.
- Neither the cats nor the dog **is** barking.

When more than one noun is joined by the conjunction 'or', the subject is singular, and a singular verb is used.

- Celery or spring onion works fine.
- Your mom or dad has to be here in an hour.

5. Collective Nouns = Singular or Plural

Collective nouns (e.g., team, group, class) take a singular verb when acting as one unit and a plural verb when acting as individuals.

- The team **is** winning the match. (One unit)
- The team **are** arguing among themselves. (Individuals)

6. Indefinite Pronouns

Some indefinite pronouns are singular, some are plural, and some depend on the context.

Singular Pronouns:

Everyone, someone, nobody, no one, anybody, everything etc.

- Everyone **is** excited about the trip.
- Everything in the room **looks** beautiful.
- No one **finds** the movie interesting.

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Plural Pronouns:

Few, many, several, both.

- Many **are** ready for the challenge.
- Few **have** completed the homework on time.

Depends on Context:

All, some, none.

- Some of the cake is gone. (Cake --- Singular)
- Some of the apples are missing. (Apples --- Plural)

7. Measurements, Money and Distances:

When a measurement, distance, or amount is treated as a single unit, it takes a singular verb.

- Five kilometers **is** a long distance.
- Ten meters **is** enough for each row.
- Ten dollars **is** enough.

8. When you have sentences that begin with 'here', 'there', 'this', 'that', 'those', 'these', etc., Always remember that the subject follows the verb and therefore the verb must be conjugated with reference to the subject.

- Here **is** your book.
- That **was** a great movie.
- There **have** been many changes in the timetable

9. Abstract nouns are considered as singular subjects, so make sure you use a singular verb along with it.

- Honesty **is** the best policy.
- Happiness **is** important.

Exceptions: When referring to specific instances or individual elements of an abstract concept, plural verbs may be used.

His ideas on truth **are** widely accepted.

10. Countable Nouns: Singular Countable Noun: When the subject is a singular countable noun, use a singular verb. **Plural Countable Noun:** When the subject is a plural countable noun, use a plural verb.

- A book **is** on the table.
- Books **are** on the table.

Exceptions: When countable nouns are treated as a collective unit or abstract idea, they may take a singular verb.

- The team **is** ready for the game. (treating team as one entity)
- The class **is** studying for the final exam. (treats the class as a collective group)

EXAMPLES

1. The dog barks loudly every night.
2. The children play in the park after school.
3. My friend and I are going to the library.
4. Either the teacher or the principal has the key.
5. Each of the students is responsible for their own work.
6. The books on the shelf are dusty.
7. A group of tourists is visiting the museum.
8. Nobody knows the answer to the question.

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9. Ten dollars is enough to buy a snack.
10. The flowers in the garden bloom beautifully in spring.
11. Few understand the importance of exercise.
12. The furniture of the house is quite impressive.
13. Fast food, such as burgers and street food, is harmful to our health.
14. The news was broadcasted last night.
15. The list of items is on the desk.

3. Reported speech (Declaratives & Interrogatives)

Direct speech is when we repeat exactly what someone said, using quotation marks.

E.g. Mom said, "I am cooking dinner."

Indirect speech (or reported speech) is when we tell what someone said without using quotation marks.

E.g. Mom said that she was cooking dinner.

General Steps to Convert Declarative Sentences:

Key Rules

Rule 1: Change the Tense (If the Reporting Verb is in the Past)

Present → Past → Past Perfect → No change				
Will → Would	Can → Could	Shall → Should	May → Might	Must → Had to/Must

Would, Could, Should, Might, Ought → NO CHANGE

Tense Changes:

Direct Speech	Indirect Speech
Present Simple (<i>am/is/are</i>)	Past Simple (<i>was/were</i>)
Present Continuous (<i>is eating</i>)	Past Continuous (<i>was eating</i>)
Present Perfect (<i>has/have eaten</i>)	Past Perfect (<i>had eaten</i>)
Past Simple (<i>ate</i>)	Past Perfect (<i>had eaten</i>)
Past Continuous (<i>was eating</i>)	Past Perfect Continuous (<i>had been eating</i>)
Future Simple (<i>will eat</i>)	Future-in-the-Past (<i>would eat</i>)

Rule 2: Drop the Quotation Marks & Add 'that'

- Direct: *She said, "I am tired."*
- Indirect: *She said (that) she was tired.*

Rule 3. Change the Pronouns

Pronouns change based on who is speaking and who is listening.

- "I" becomes "he" or "she."
- "You" becomes "me," "us," or "them" depending on the listener.

Examples:

He said, "I am a teacher." → He said that he was a teacher.

She said to me, "You are my best friend." → She told me that I was her best friend

Rule 4. Time and Place Words

Time and place words shift to match the time when reported.

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Direct Speech

Today

Tomorrow

Yesterday

Now

Here

This

Last week/month/year

Next week/month/year

Indirect Speech

That day

The next day

The previous day

Then

There

That

The previous week/month/year

The following week/month/year

Examples:

Direct



Indirect Speech

1. He said, "I will do it tomorrow." → He said that he would do it the next day.
2. She said, "I was here yesterday." → She said that she had been there the previous day.
3. Jamila: 'I travel a lot in my job.' → Jamila said that she travelled a lot in her job.
4. He said to me, 'The baby is sleeping!' → He told me the baby was sleeping.
5. She said, 'I've hurt my leg.' → She said she had hurt her leg.
6. "I'm going to the movies tonight," said David. → David told me that he was going to the movies that night.

General Steps to Convert Interrogative Sentences:

1. **Remove Quotation Marks and Question Marks.**

In indirect speech, questions are reported as statements. **No question marks!**

2. Use a **Reporting Verb** like:

Asked, Inquired, wondered, wanted to know, etc.

3. Adjust **Pronouns, Tenses, and Time Expressions** as per indirect speech rules.

1. Reporting Yes/No Questions

Use **if** or **whether** to introduce the reported question. Change the verb structure from question to statement form.

Examples:

Direct: She asked, "Do you like ice cream?"

Indirect: She asked if I liked ice cream.

Direct: He asked, "Will it rain tomorrow?"

Indirect: He asked whether it would rain the next day.

2. Reporting WH-Questions

Keep the **Wh-word** but follow the statement word order (subject + verb), not the question word order.

Examples:

- Direct: She asked, "Where do you live?"
Indirect: She asked where I lived.
- Direct: He asked, "Why are you crying?"
Indirect: He asked why I was crying.

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3. Tense Changes in Indirect Speech: Follow the rules of tense shifting (if the reporting verb is in the past).

Direct Speech Tense	Indirect Speech Tense
Present Simple (<i>do, does</i>)	Past Simple (<i>did</i>)
Present Continuous (<i>am, is, are doing</i>)	Past Continuous (<i>was, were doing</i>)
Present Perfect (<i>have /has done</i>)	Past Perfect (<i>had done</i>)
Past Simple (<i>did</i>)	Past Perfect (<i>had done</i>)
Future Simple (<i>will do</i>)	Future-in-the-Past (<i>would do</i>)

✓ **Time and place words shift to match the time when reported.**

EXAMPLES

1. Direct: "Did you finish your homework?" she asked.

Indirect: She asked if I had finished my homework.

2. Direct: "Why is the sky blue?" he asked.

Indirect: He asked why the sky was blue.

3. Direct: "Will you join us?" they asked.

Indirect: They asked if I would join them.

4. Direct: "What are you doing tomorrow?" she asked.

Indirect: She asked what I was doing the next day.

5. Direct "Where do you live?" the stranger asked Aladdin.

Indirect: The stranger asked Aladdin where he lived.

Exceptions:

1. If the Reporting Verb is in Present or Future Tense

If the reporting verb (says, will say) is in **the present or future tense**, the **tense** in the reported speech **does not change**.

Examples:

Direct Speech: She says, "I love coffee."

Indirect Speech: She says that she loves coffee.

(No tense change as "**says**" is in the present tense.)

Direct Speech: He will say, "I am happy."

Indirect Speech: He will say that he is happy.

(No tense change as "**will say**" is in the future tense.)

2. Universal Truths or Facts

When the reported speech contains **universal truths, facts, or general statements**, the **tense remains the same**, regardless of the reporting verb's tense.

Examples:

- Direct Speech: The teacher said, "The sun rises in the east."
Indirect Speech: The teacher said that the sun rises in the east.
- Direct Speech: He said, "Water boils at 100°C."
Indirect Speech: He said that water boils at 100°C.

3. Habitual Actions

Statements about **habitual or repeated actions do not change tense** because they are still valid.

Examples:

- Direct Speech: She said, "I go to the gym every day."
Indirect Speech: She said that she goes to the gym every day.
- Direct Speech: He said, "I read before bed."
Indirect Speech: He said that he reads before bed.

4. Past Perfect Tense

If the original speech uses **past perfect tense**, **tense remains unchanged** in indirect speech since it cannot be shifted further back in time.

Example:

Direct Speech: She said, "I had already eaten."

Indirect Speech: She said that she had already eaten.

4. Participles, Gerunds, and Infinitives

1. Participles

A **participle** is a verb form that acts as an adjective, describing a noun or pronoun.

Participles can be:

- **Present Participles** (*verb + ing*)
- **Past Participles** (*usually ends in -ed, -en, -t, etc.*)

Uses of Participles

- **Present Participle:** Describes ongoing actions. (*The running water sounds soothing.*)
- **Past Participle:** Describes completed actions or conditions. (*The broken vase was expensive.*)

Examples:

1. The **barking dog** scared the children. (*Present participle*)
2. The **painted walls** look beautiful. (*Past participle*)
3. **Excited by the news**, she jumped with joy. (*Participial phrase*)

2. Gerunds

A **gerund** is a verb form ending in **-ing** that acts as a noun. Gerunds are used:

- As the **subject** of a sentence. (*Swimming is fun.*)
- As the **object** of a verb. (*I enjoy reading.*)
- After prepositions. (*He's good at cooking.*)

Examples:

1. **Dancing** is my favorite hobby. (*Gerund as the subject*)
2. I love **skating** in the winter. (*Gerund as the object*)
3. They talked about **traveling** to Europe. (*Gerund after a preposition*)

3. Infinitives

An **infinitive** is the base form of a verb, often preceded by **"to"** (e.g., *to run, to sing*). Infinitives can act as nouns, adjectives, or adverbs. (**to+V1**)

Uses of Infinitives:

1. **As the Object:** *She wants to dance.*

2. **To Show Purpose:** *I study to learn.*

Examples:

1. She decided **to visit** her friend. (*Infinitive as the object*)
2. He works hard **to succeed**. (*Infinitive showing purpose*)

Comparison Chart

Feature	Participle	Gerund	Infinitive
Definition	Verb acting as an adjective	Verb acting as a noun	Base form of the verb
Forms	Present (<i>-ing</i>), Past (<i>-ed/-en</i>)	Ends in <i>-ing</i>	<i>to + verb</i>
Role	Describes nouns	Acts as a subject/object	Acts as noun/adjective/adverb
Examples	<i>The crying baby.</i>	<i>Swimming is fun.</i>	He helped to carry the bag.

5. Coordinating and Subordinating Conjunctions

1. Coordinating Conjunctions

Coordinating conjunctions are used to join words, phrases, or clauses of equal importance in a sentence. They connect elements that are grammatically the same.

Common Coordinating Conjunctions:

- **FANBOYS** acronym can help remember them:
 - **F** → *for*
 - **A** → *and*
 - **N** → *nor*
 - **B** → *but*
 - **O** → *or*
 - **Y** → *yet*
 - **S** → *so*

Uses:

- **And:** *I like pizza **and** pasta.*
- **But:** *She is smart **but** forgetful.*
- **Or:** *Do you prefer tea **or** coffee?*
- **For:** *I was tired **for** I stayed up late.*
- **Nor:** *She likes neither pizza **nor** burgers.*
- **Yet:** *It was raining **yet** we went outside.*
- **So:** *He was tired **so** he went to bed early.*

Coordinating conjunctions are also used to connect independent clauses together:

EXAMPLES

James wanted a piece of cake. He was on a diet. → James wanted a piece of cake, **but** he was on a diet.

It was a long journey. I am feeling very tired now. → It was a long journey, **so** I am feeling very tired now.

2. Subordinating Conjunctions

Subordinating conjunctions introduce **dependent** (subordinate) clauses and show the relationship between the main clause and the dependent clause.

These subordinating conjunctions can be remembered using the mnemonic **A WHITE BUS**:

- **A** - as, after, although, as long as, as much as, as soon as, as long as.
- **W** - when, whenever, where, wherever, while, whether.
- **H** - how, however
- **I** - if
- **T** - than, though
- **E** - even if, even though
- **B** - before, because
- **U** - unless, until
- **S** - so that, since

Uses:

- **Time:** *I will call you **after** I finish my homework.*
- **Cause/Condition:** *You can play outside **if** you finish your chores.*
- **Contrast:** ***Although** it was raining, we went for a walk.*
- **Purpose/Reason:** *He studied hard **so that** he could pass the exam.*

EXAMPLES

1. I wanted something to eat, **so** I looked in the fridge.
2. Reading fiction is beneficial, **for** it can make us more empathetic.
3. The host borrowed dozens of folding chairs, **yet** there were not enough for the guests.
4. We liked the play's story, **but** we didn't care for its staging.
5. I took the week off work **because** of my illness.
6. Tom will be late for school **unless** he catches the bus.
7. Jared booked a train ticket **so that** he could travel to London on Tuesday.
8. Janey was upset that she didn't pass the test **since** she had studied hard.
9. The twins were allowed to watch TV **after** they completed their homework.
10. I can start making dinner **once** I know what time they are arriving.
11. Rhea feels scared **whenever** she sees a spider.
12. Nadia forgot to add the blueberries **before** she put the muffins in the oven.

6. TENSES

1. Present Tense The present tense describes actions happening **now**, **habitually**, or **facts/truths**.

It has four forms: **Simple Present**, **Present Continuous**, **Present Perfect**, and **Present Perfect Continuous**.

a. Simple Present

Structure: **Subject + base verb (V1) (add -s/es with singular subject)**

Uses:

- Facts/General truths: **The sun rises in the east.**
- Habits/Routines: **He plays football every day.**
- Scheduled events: **The train leaves at 9 AM.**

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Examples:

- She writes neatly.
- Raj does not like spicy food.
- Paul and his brother practice the piano every day.
- Ms. Jackson travels during the summer.
- They don't work at the weekend.

b. Present Continuous

Structure: **Subject + am/is/are + base verb(V1) + ing.**

Uses:

- Actions happening now: **She is reading a book.**
- Temporary actions: **They are staying in a hotel.**
- Future plans: **We are traveling tomorrow.**

Examples:

- I am studying for the test.
- She is not watching TV.
- Prices are increasing day by day.
- The weather is getting colder.
- He is improving his English skills.
- I am meeting my friends tomorrow.

c. Present Perfect

Structure: **Subject + has/have + past participle (V3).**

Uses:

- Actions completed recently: **I have just finished my homework.**
- Life experiences: **She has visited Paris twice.**
- Actions with an effect on the present: **He has lost his keys.**
- Actions continuing from the past until now (with 'since' or 'for'): **He has lived in Khobar since 2020.**

Examples:

- They have completed the project.
- He has not eaten lunch.
- She has worked at this company for five months.
- We have traveled to many countries.
- They have been friends since childhood.

2. Past Tense

The past tense describes **actions that happened before now.**

It has four forms: Simple Past, Past Continuous, Past Perfect, and Past Perfect Continuous.

a. Simple Past

Structure: **Subject + past verb (V2).**

Uses:

- Completed actions in the past: **He went to the park.**
- Actions in a sequence: **She woke up, brushed her teeth, and left.**

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Examples:

- I watched a movie yesterday.
- He did not call me.
- Last year, I travelled to France.
- My mother bought a dress for me.
- Shina worked as a waitress while she was in college.

b. Past Continuous

Structure: **Subject + was/were + base verb(V1) + ing**

Uses:

- Actions happening at a specific time in the past: **She was studying at 5 PM.**
- Two ongoing actions: **I was cooking while he was reading.**

Examples:

- They were playing soccer yesterday evening.
- He was not listening to the teacher.
- While I was studying, my friends were playing.
- The days were getting shorter as winter approached.
- The baby was sleeping peacefully until the alarm rang.

c. Past Perfect

Structure: **Subject + had + past participle (V3).**

Uses:

- Action completed before another past action: **She had left before I arrived.**
- Denoting the time until a specific point in the past: **Ann had published her first poem by the time she was eight.**

Examples:

- He had completed the work before the deadline.
- They had not met her before.
- The park had closed by the time we got there.
- The train had arrived on the second platform when we reached the station.
- We had finished all the water before we were halfway up the mountain.

7. BOOKS & AUTHORS

1. **William Shakespeare** – Romeo and Juliet, The Merchant of Venice, Julius Caesar.
2. **Charles Dickens** – A Tale of Two Cities, Oliver Twist, Great Expectations.
3. **Jane Austen** – Pride and Prejudice, Sense and Sensibility, Emma
4. **Herman Melville** – Moby-Dick
5. **Victor Hugo** – Les Misérables, Toilers of the Sea
6. **Leo Tolstoy** – War and Peace, Anna Karenina
7. **Mark Twain** – The Adventures of Tom Sawyer
8. **Mary Shelley** – Frankenstein
9. **Emily Brontë** – Wuthering Heights
10. **Fyodor Dostoevsky** – Crime and Punishment
11. **George Orwell** – 1984

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12. **J.R.R. Tolkien** – The Lord of the Rings
13. **Harper Lee** – To Kill a Mockingbird
14. **Gabriel García Márquez** – One Hundred Years of Solitude
15. **Ernest Hemingway** – The Old Man and the Sea
16. **F. Scott Fitzgerald** – The Great Gatsby
17. **John Steinbeck** – Of Mice and Men
18. **J.D. Salinger** – The Catcher in the Rye
19. **George R.R. Martin** – A Game of Thrones
20. **Margaret Atwood** – The Handmaid's Tale
21. **J.K. Rowling** – *Harry Potter and the Philosopher's Stone*
22. **C.S. Lewis** – *The Lion, the Witch, and the Wardrobe*
23. **Roald Dahl** – *Charlie and the Chocolate Factory*
24. **Louisa May Alcott** – *Little Women*

8.LITERATURE AWARDS

Book	Author	Award	Year
Harry Potter and the Goblet of Fire	J.K. Rowling	Hugo Award	2001
Midnight's Children	Salman Rushdie	Booker Prize	1981
Milkman	Anna Burns	Booker Prize	2018
The Promise	Damon Galgut	Booker Prize	2021
<i>The Jungle Book and Kim</i>	Rudyard Kipling	The first English writer to be awarded the Nobel Prize for Literature	1907
The Sound and the Fury	William Faulkner	Nobel Prize	1949
A Bend in the River	V.S. Naipaul	Nobel Prize	2001
Gitanjali	Rabindranath Tagore	The first Indian writer to be awarded the Nobel Prize for Literature.	1913
All the Light We Cannot See	Anthony Doerr	Pulitzer Prize for Fiction	2015
His overall contribution to poetry rather than any specific work.	Sully Prudhomme (French poet)	The first recipient of the Nobel Prize in Literature.	1901

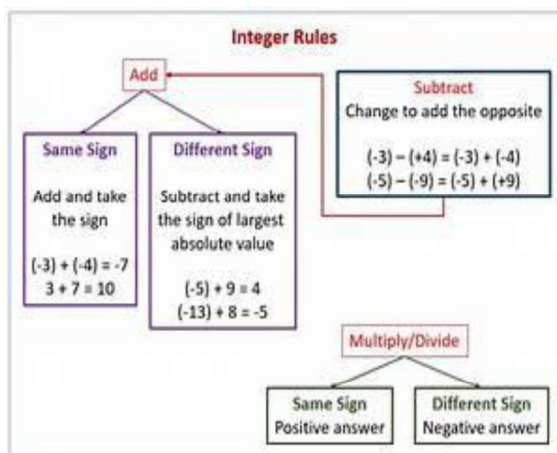
SUBJECT: MATHS

CLASS 7 INTEGERS

A Introduction to Integers



- i) **Natural Numbers** Counting numbers are known as natural numbers.
1, 2, 3, 4, 5, 6, ... are all natural numbers.
- ii) **Whole Numbers** All natural numbers together with zero are known as whole numbers.
0, 1, 2, 3, 4, 5, 6, ... are whole numbers.
- iii) **Integers** All natural numbers, zero and negative counting numbers are known as integers.
{..., -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ... } are all integers. 1, 2, 3, 4, 5, ... are all *Positive Integers*.
-1, -2, -3, -4, -5 are all *Negative Integers*. **Zero** is an integer which is neither positive nor negative.



B. Properties of Addition of Integers

i) **Closure property of addition** The sum of two integers is always an integer.

Example 1. $3 + 2 = 5$, here number 5 is a positive integer.

Example 2. $5 + (-9) = -4$, is a negative integer

Example 3. $-4 + (-5) = -9$, is a negative integer

Example 4. $12 + (-7) = 5$, is a positive integer

Example 5. $-5 + 5 = 0$, is an integer

ii) **Commutative law of addition** If 'a' and 'b' are any two integers, then $a + b = b + a$.

Example 1. $-3 + 7 = 4$ and $7 + (-3) = 4$

Hence, $-3 + 7 = 7 + (-3)$.

iii) **Associative law of addition**

If a, b, c are any three integers, then $(a + b) + c = a + (b + c)$. Let's see some examples.

Example 1. Consider three integers 4, -5, -7.

$$\{4 + (-5)\} + (-7) = (4 - 5) - 7 = -1 - 7 = -8$$

$$\text{and, } 4 + \{(-5) + (-7)\} = 4 + (-12) = -8$$

c) **Additive Identity**

For any integer 'p', we have: $p + 0 = 0 + p = p$.

0 is called the additive identity for integers. Let's see some examples.

Ex1. $8 + 0 = 0 + 8 = 8$.

d) **Additive inverse**

For any integer 'p', we have: $p + (-p) = (-p) + p = 0$ The opposite of an integer 'p' is (-p).

The sum of an integer and it's **Additive inverse** is 0.

Additive inverse of p is (-p).

Example 1. $4 + (-4) = (-4) + 4 = 0$, So, the additive inverse of 4 is (-4). Additive inverse of (-4) is 4.

ii) **Properties of Subtraction of Integers**

a) **Closure Properties of Subtraction**

If 'a' and 'b' are any two integers, then $(a - b)$ is always an integer.

Example 1. $5 - 4 = 5 + (-4) = 1$, which is an integer.

Example 2. $-3 - 6 = (-3) + (-6) = -9$, which is an integer.

b) Subtraction of Integers is not Commutative.

If 'a' and 'b' are any two integers, then $a - b \neq b - a$.

Examples 1. Consider two integers 4 and 9.

$$4 - 9 = 4 + (-9) = -5$$

$$9 - 4 = 9 + (-4) = 5$$

Hence, $4 - 9 \neq 9 - 4$

c) Subtraction of Integers is not Associative.

If a, b, c are any three integers, then $(a - b) - c \neq a - (b - c)$.

Example 1. Consider three integers as 5, 7, and -2.

$$(5 - 7) - (-2) = -2 + 2 = 0$$

$$\text{And } 5 - \{7 - (-2)\} = 5 - (7 + 2) = 5 - 9 = -4$$

Hence, $(5 - 7) - (-2) \neq 5 - \{7 - (-2)\}$

III) Multiplication of Integers

a) Multiplication of Two Positive Integers

Multiplication of two positive integers gives product as positive integer.

Example 1. $5 \times 6 = 30$, which is a positive integer.

Ex2. $6 \times 10 = 60$, which is a positive integer.

b) Multiplication of Positive and Negative Integers

Product of one positive and one negative integers is a negative integers.

Example 1. $5 \times (-8) = -40$, which is a negative integer.

Ex2. $(-8) \times 10 = -80$, which is a negative integer.

c) Multiplication of Two Negative Integers

Multiplication of two negative integers gives product as a positive integer..

Example 1. $(-4) \times (-5) = 20$ **Example 2.** $(-5) \times (-8) = 40$

d) Multiplication by Zero

If any integer multiplied by zero, then the result will be zero.

Example 1. $5 \times 0 = 0$

III) Properties of Multiplication of Integers

a) Closure Property of Multiplication

The product of two integers is always an integer.

Example 1. $4 \times 5 = 20$, which is an integer.

b) Commutative Law of Multiplication

For any two integers 'a' and 'b', $(a \times b) = (b \times a)$

Example 1. Consider 2 and 5 as two integers. $2 \times 5 = 10$ and $5 \times 2 = 10$

c) Associative Law of Multiplication

For any three integers 'a', 'b', 'c', $(a \times b) \times c = a \times (b \times c)$

Ex1. Consider three integers 4, (-5), and 6.

$$\{4 \times (-5)\} \times 6 = 4 \times \{(-5) \times 6\}$$

IV) Distributive Law of Multiplication over Addition

For any three integers a, b, c, $a \times (b + c) = (a \times b) + (a \times c)$.

Example 1. Consider three integers 2, (-3) and (-5).

$$2 \times \{(-3) + (-5)\} = \{2 \times (-3)\} + \{2 \times (-5)\}$$

V) Multiplicative Identity

For every integer 'a', we have $(a \times 1) = (1 \times a) = a$

1 is called multiplicative identity for integers.

VI) Multiplicative Inverse

Multiplicative inverse of a nonzero integer 'a' is the number $\frac{1}{a}$.

$$a \times \frac{1}{a} = \frac{1}{a} \times a = 1$$

Example 1. Multiplicative inverse of 5 is $\frac{1}{5}$.

TALENT SEARCH STUDY MATERIAL – CLASS VII

VI) Property of Zero

If any integer multiplied by zero then the result will be zero. $(a \times 0) = (0 \times a) = 0$

VII) a) Division of Integers Having Like Signs

For dividing one integer by the other having like signs,

Example 1. Divide 95 by 5.

$$95 \div 5 = \frac{95}{5} = 19$$

b) Division of Integers Having Unlike Signs

For dividing two integers having unlike signs, we divide their values and give a minus sign to the quotient.

Example 1. Divide (-150) by 15.

$$(-150) \div 15 = \frac{-150}{15} = -10$$

Practice Exercise (INTEGERS)

1. Manvita deposits Rs. 5000 in her bank account after two days. She withdraws Rs.3748 from it. If the amount deposited is a positive integer. Represent the amount withdrawn and also find the balance amount in the account as integer?

a) (Withdrawal of 3748 & Bal.1252) **b) (-3748) & 1252**

c) Rs 3745& Rs.1252

d) None

(Ans1 b.)

2. Find the product with suitable properties for $(16 \times -34) + (-34 \times -18)$

a) (-68) , commutative property

b) 68 Associative property

c) (-68) Distributive property

d) 68 Distributive property

(Ans2.d)

3. A fruit merchant earns a profit of Rs. 6 per bag of orange sold and a loss of Rs. 4 per bag of grapes sold. a. Merchant sells 1800 bags of orange and 2500 bags of grapes. What is the profit or loss?

a) Loss of Rs. 800

b) Profit of Rs. 800

c) No profit no loss

(Ans3.b)

4. In an Examination, $(+2)$ marks are given for every correct answer, and (-0.5) marks are given for every wrong answer, and 0 for non-attempting any question. (a) Latika scores 30 marks. If she got 20 correct answers, and (b) Sara scores -4 marks if she got 3 correct answers. How many question attempted incorrectly by Latika and Saara?

a) Both attempted 20 questions incorrectly

b) incorrect answers for Latika 4 and Sara 20

c) Incorrect answers for Latika 20 and Sara 4

d) a) None of these.

(Ans4. a)

5. $(-5) \times (-4) \times (-6) = \underline{\hspace{2cm}}$.

a) 120

b) 24

c) -120

d) None of these

(Ans5.c)

6. What will be the sign of the product if we multiply 75 negative integers and 10 positive integers?

a) Negative

b) Positive

c) Both a and b

d) None of these

(Ans6. a)

7. $(-1) \times (-1) \times (-1) \times \dots$ 100 times is equal to (-100) mark True / False.

(Ans7. b)

a) True

b) False

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8. $(-90) \times \underline{\hspace{2cm}} = 450$.

a) 5

b) 45

c) 9

d) -5

(Ans8. d)

9. $(-12) \times \underline{\hspace{2cm}} = 12$.

(Ans9. -1)

10. Multiplicative inverse of -1 is equal to _____.

a) 1

b) 2

c) 0

d) -1

(Ans10. - 1)

CH 2- LINES AND ANGLES

INTRODUCTION: We know some basic concepts of geometry like Point, Lines, line segments, parallel and perpendicular lines, Angles and types angles etc. Now, we are going to learn about complementary angles, supplementary angles, adjacent angles, sum of angles at a point, and many more concepts.

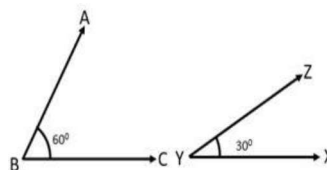
Complementary Angles

Two angles are known as complementary angles if the sum of their measures is 90° . Each angle is called the complement of the other angle.

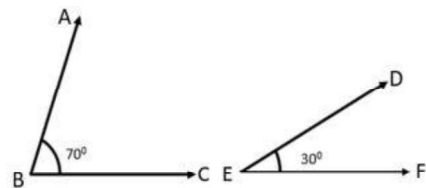
Example 1. Prove that below provided angles are complementary angles.

Here, $\angle ABC + \angle XYZ = 60^\circ + 30^\circ = 90^\circ$

Sum of both the angles is 90° , hence, $\angle ABC$ and $\angle XYZ$ are complementary.



Example 2. Prove that below provided angles are not complementary.



Here, $\angle ABC + \angle DEF = 70^\circ + 30^\circ = 100^\circ$

Sum of both the angles is 100° , hence, $\angle ABC$ and $\angle DEF$ are not complementary.

Example 3. Find the angle which is equal to its complement.

Solution. Let's assume one of the two angles is 'p'.

Hence, $p + p = 90^\circ$

$$\Rightarrow 2p = 90^\circ$$

$$\Rightarrow p = 90^\circ/2$$

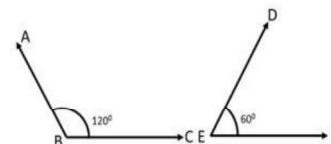
$\Rightarrow p = 45^\circ$ So, 45° is the angle equal to its complement.

Supplementary Angles Two angles are known as supplementary angles if the sum of their measures is 180° . Each angle is called supplement of the other angle

Example 1. Prove that below provided angles are supplementary angles.

Here, $\angle ABC + \angle DEF = 120^\circ + 60^\circ = 180^\circ$

Sum of both the angles is 180° , hence, $\angle ABC$ and $\angle DEF$ are supplementary.

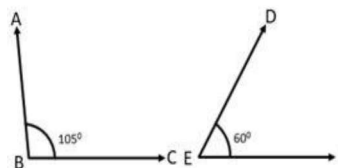


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Example 2. Prove that below provided angles are not supplementary angles.

Here, $\angle ABC + \angle DEF = 105^\circ + 60^\circ = 165^\circ$

Sum of both the angles is 165° , hence, $\angle ABC$ and $\angle DEF$ are not supplementary.



Example 3. Find the angle which is equal to its supplement.

Solution. Let's assume one of the two supplementary angles be 'q'

$$\text{So, } q + q = 180^\circ$$

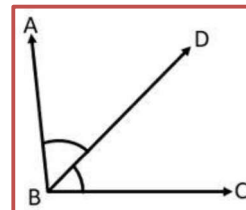
$$\Rightarrow 2q = 180^\circ$$

$$\Rightarrow q = \frac{180^\circ}{2}$$

$$\Rightarrow q = 90^\circ$$

Hence, 90° is the angle equal to its

complement.

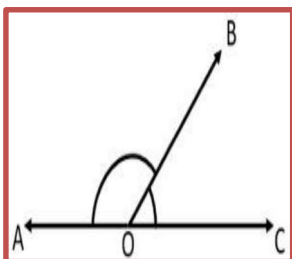


it's

Adjacent Angles: Two angles are known as adjacent angles if they have a common vertex, a common arm and their non-common arms lie on either side of the common arm.

Here, $\angle ABD$ and $\angle DBC$ have a common vertex B, common arm is BD, and both the non-common arms BA and BC lie on either sides of the common arm BD.

Linear Pair



Two adjacent angles can form a linear pair if their non-common arms are opposite rays as shown in below figure. In other words, if a pair of supplementary angles are placed adjacent to each other, then they will form a linear pair.

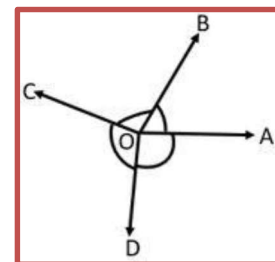
$$\Rightarrow \angle AOC = \angle AOB + \angle BOC$$

$$\Rightarrow \angle AOB + \angle BOC = 180^\circ$$

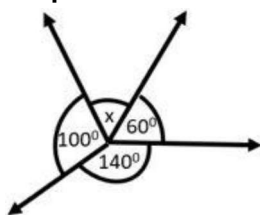
Angles about a Point

If a number of angles are formed about a point as shown in the below figure, their sum will always be 360° .

$$\angle AOB + \angle BOC + \angle COD + \angle DOA = 360^\circ$$



Example 1. Find the value of 'x' in the below given diagram.



Solution. As we know sum of all angles at a point = 360°

$$\Rightarrow x + 60^\circ + 140^\circ + 100^\circ = 360^\circ$$

$$\Rightarrow x + 300^\circ = 360^\circ$$

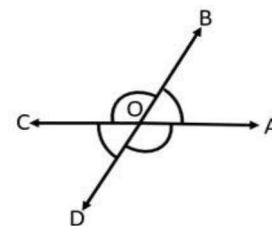
$$\Rightarrow x = 360^\circ - 300^\circ \Rightarrow x = 60^\circ$$

Hence, x is 60° .

Vertically Opposite Angles

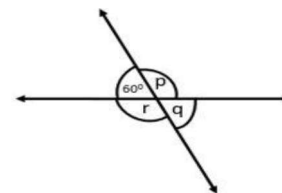
When two straight lines intersect each other, they form four angles at the point of intersection. The pair of angles which lie on the opposite sides of the point of intersection are known as vertically opposite angles.

$$\angle AOB = \angle COD \text{ and } \angle BOC = \angle DOA$$



Example 1. Find the values of p, q, and r in the below diagram.

Solution. Here, $q = 60^\circ$

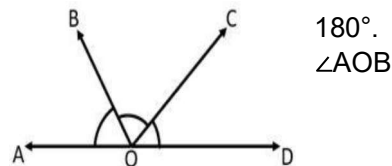


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As we know, $p + 60^\circ = 180^\circ$ (Linear pair)
 $\Rightarrow p = 180^\circ - 60^\circ$
 $\Rightarrow p = 120^\circ$
 $p = r = 120^\circ$ So, $p = 120^\circ$, $q = 60^\circ$, and $r = 120^\circ$

Angles on One Side of a Straight Line

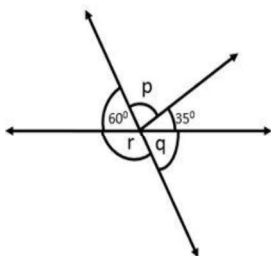
Sum of angles at a point on one side of a straight line is equal to
 $+ \angle BOC + \angle COD = \angle AOD = 180^\circ$



Example 1. Find the value of p , q and r in the below diagram.

Solution. Here, $q = 60^\circ$ (vertically opposite angles)
 $\Rightarrow 60^\circ + p + 35^\circ = 180^\circ$ (A.S.P.)

$$\Rightarrow p = 180^\circ - 60^\circ - 35^\circ$$

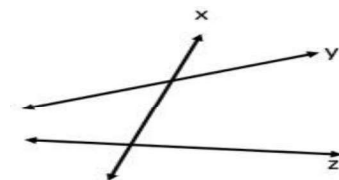


$$\begin{aligned} \Rightarrow p &= 85^\circ \\ \Rightarrow r + q &= 180^\circ \\ \Rightarrow r + 60^\circ &= 180^\circ \text{ (L.P.)} \\ \Rightarrow r &= 180^\circ - 60^\circ \\ \Rightarrow r &= 120^\circ \end{aligned}$$

Hence, $p = 85^\circ$, $q = 60^\circ$, and $r = 120^\circ$.

Concept of Transversal

A straight line which cuts two or more straight lines is known as transversal. In the above figure, line 'x' intersects two lines 'y' and 'z' at different points. Here line 'x' is known as transversal.



Types of angles formed as shown in the given diagram

Interior Angles Here $\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$ are interior angles.

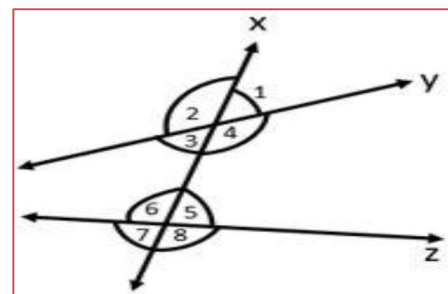
Exterior Angles Here $\angle 1$, $\angle 2$, $\angle 7$ and $\angle 8$ are exterior angles.

Corresponding Angles four pairs $\angle 1$, $\angle 5$; $\angle 2$, $\angle 6$; $\angle 3$, $\angle 7$; $\angle 4$, $\angle 8$ are called pairs of corresponding angles.

Alternate Interior Angles $\angle 3$, $\angle 5$ and $\angle 4$, $\angle 6$ are called alternate interior angles.

Alternate Exterior Angles $\angle 1$, $\angle 7$ and $\angle 2$, $\angle 8$ are called alternate exterior angles.

Co-interior Angles $\angle 3$, $\angle 6$ and $\angle 4$, $\angle 5$ are called co-interior angles.

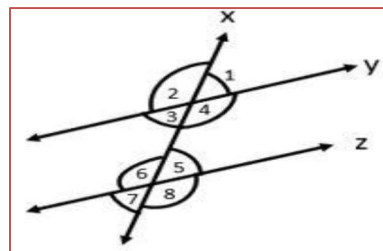


TALENT SEARCH STUDY MATERIAL – CLASS VII

Properties of Angles Made by a Transversal with Two Parallel Lines

A transversal 'x' intersect two parallel lines 'y' and 'z' as shown in the diagram.

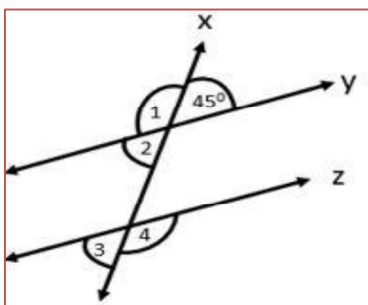
Total 8 angles are formed at two intersection point, and the angles are $\angle 1, \angle 2, \angle 3, \angle 4, \angle 5, \angle 6, \angle 7, \angle 8$.



In the above diagram $\angle 1 = \angle 5$ and $\angle 2 = \angle 6, \angle 3 = \angle 7$ and $\angle 4 = \angle 8$

Example 1. In the below provided diagram $y \parallel z$. Find the measure of all the marked angles.

Solution. Since 'y' and 'z' are parallel and a transversal 'x' meets them, therefore



$$\angle 2 = 45^\circ \text{ (vertically opposite angles)}$$

$$\angle 2 = \angle 3 = 45^\circ \text{ (Corresponding angles)}$$

$$\angle 1 + 45^\circ = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow \angle 1 = 180^\circ - 45^\circ$$

$$\Rightarrow \angle 1 = 135^\circ$$

$$\angle 3 + \angle 4 = 180^\circ$$

$$\Rightarrow 45^\circ + \angle 4 = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow \angle 4 = 180^\circ - 45^\circ$$

$$\Rightarrow \angle 4 = 135^\circ$$

Example 2. Prove that lines A and B are parallel to each other.

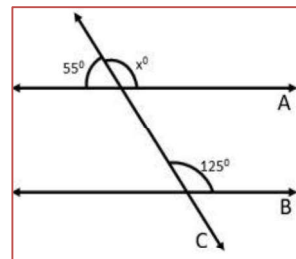
Solution. Let's find out angle x° as per linear pair rule.

$$55^\circ + x^\circ = 180^\circ$$

$$\Rightarrow x^\circ = 180^\circ - 55^\circ$$

$$\Rightarrow x^\circ = 125^\circ$$

Here, we can see corresponding angles are equal. Hence it is proved that line A and B are parallel.



Example 3. In the below given diagram $AB \parallel CE$. Find the value of p, q and r.

Solution. As $AB \parallel CE$

$$r = 52^\circ \text{ (Alternate angles)}$$

$$q + r + 55^\circ = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow q + 52^\circ + 55^\circ = 180^\circ$$

$$\Rightarrow q = 180^\circ - 52^\circ - 55^\circ$$

$$\Rightarrow q = 73^\circ$$

Summation of all the angles of a triangle is 180° .

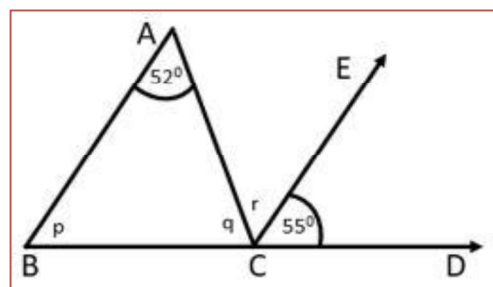
$$p + q + 52^\circ = 180^\circ$$

$$\Rightarrow p + 73^\circ + 52^\circ = 180^\circ$$

$$\Rightarrow p = 180^\circ - 73^\circ - 52^\circ$$

$$\Rightarrow p = 55^\circ$$

Hence, $p = 55^\circ, q = 73^\circ$ and $r = 52^\circ$.



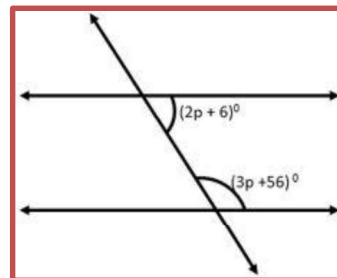
TALENT SEARCH STUDY MATERIAL – CLASS VII

Example 4. In the below given diagram a pair of parallel lines are cut by a transversal. Find the value of 'p'.

Solution. Supplementary angle of $(2p+6)^\circ = 180^\circ - (2p+6)^\circ$
 $= 180^\circ - 2p - 6^\circ$
 $= 176^\circ - 2p$

As we know, corresponding angles are same
 $\Rightarrow 176^\circ - 2p = 3p + 56^\circ$
 $\Rightarrow 5p = 176^\circ - 56^\circ$
 $\Rightarrow 5p = 120^\circ$
 $\Rightarrow p = \frac{120^\circ}{5}$
 $\Rightarrow p = 24^\circ$

Hence, p is equal to 24°

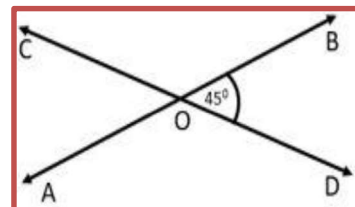


Class7 Practice Exercise (Lines and angles)

1. In the below diagram two straight lines AB and CD intersect at a point O. If $\angle BOD = 45^\circ$, then find the measure of each other angles.

- a) $\angle BOC = 125^\circ$, $\angle AOC = 45^\circ$, $\angle AOD = 135^\circ$
b) $\angle BOC = 135^\circ$, $\angle AOC = 45^\circ$, $\angle AOD = 135^\circ$
c) $\angle BOC = 125^\circ$, $\angle AOC = 55^\circ$, $\angle AOD = 135^\circ$
d) $\angle BOC = 135^\circ$, $\angle AOC = 55^\circ$, $\angle AOD = 135^\circ$

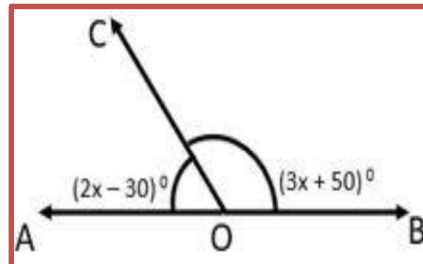
(Answer1. b)



2. Find the value of 'x' in the below given diagram.

- a) 16° b) 24°
c) 32° d) 48°

(Answer2.c)

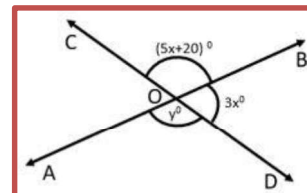


3. AB and CD are two straight lines intersecting on point O as shown in the below diagram.

Find the value of $(x + y)$.

- a) 160° b) 240°
c) 140° d) 480°

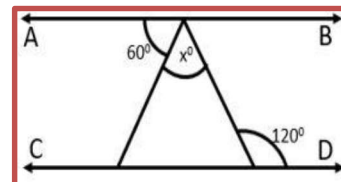
(Answer 3 – c)



4. Find the value of 'x' in the below given diagram.

- a) 40° b) 24°
c) 32° **d) 60°**

(Answer 4 – d)



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5. Find the value of 'x' and 'y' in the below given diagram.

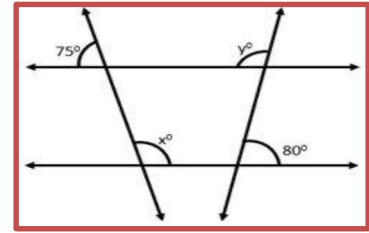
a) $x = 105^\circ, y = 110^\circ$

b) $x = 105^\circ, y = 100^\circ$

c) $x = 105^\circ, y = 105^\circ$

d) $x = 100^\circ, y = 100^\circ$

(Answer 5– b)

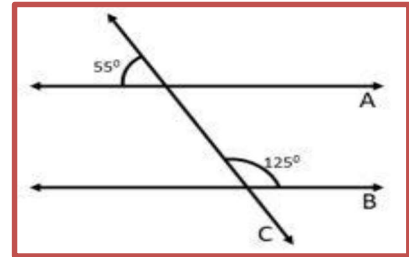


6. In the below given diagram A and B are two parallel lines..

a) True

b) False

(Answer 7– True)



Say True (T) for right and False (F) for false statements

7. Pair of vertically opposite angles are always supplementary. (F)

8. Two adjacent angles always form a linear pair.(F)

9. Alternate interior angles are on the opposite side of the transversal. (T)

10. If two adjacent angles are supplementary, then they form a linear pair.(T)

CH 3 – COMPARING QUANTITIES

Percentage-Another way of Comparing Quantities

Percentages are numerators of fractions with denominator 100. They are used for comparisons.

Meaning of Percentage

Percent means 'per hundred'. It is represented by the symbol % and means hundredths too.

Thus, 1% means 1 out of hundred or one-hundredths. It can be written as:

$$1\% = \frac{1}{100} = 0.01$$

1, Converting Fractional Numbers to Percentage

Fractional numbers can have different denominators. To compare fractional numbers we need a common denominator and it is more convenient to compare if the denominator is 100. So, we convert the fraction to percentages.

Percentages related to proper fractions are less than 100 whereas percentages related to improper fractions are more than 100.

i) Conversion of Fraction into Percentage

Ex1. Convert $\frac{2}{5}$ into fraction.

Solution. $\frac{2}{5} = \frac{2}{5} \times 100 = 40\%$

ii) Conversion of Percentage into a Fraction

Ex1. Express 20% in fraction form.

Solution. $20\% = \frac{20}{100} = \frac{1}{5}$

2. Converting Decimals to Percentage

We multiply the decimal by 100 and affix percentage symbol.

TALENT SEARCH STUDY MATERIAL – CLASS VII

i) Conversion of Decimal into Percentage

Ex1. Convert 0.65 into percentage. **Solution.** $0.65 = 0.65 \times 100 = 65\%$

Q. Convert 2.75 into percentage. (Ans. 275%)

ii) Conversion of Percentage into Decimal

Ex1. Convert 72% into decimal. **Solution.** $72\% = \frac{72}{100} = 0.72$

Q. Convert 175% into decimal. (Ans. 1.75)

3. Ratios to Percents : Sometimes, parts are given to us in the form of ratios and we need to convert those to percentage.

i) Conversion of Percentage into Ratio.

Ex.1. Express 30% in fraction form.

Solution. $30\% = \frac{30}{100} = \frac{3}{10} = 3 : 10$

Q. Express 32.5% in fraction form. (Ans. 13 : 40)

ii) Conversion of Ratio into Percentage.

Ex1. Express 2:5 in percentage form.

Solution. $2:5 = \frac{2}{5} = \frac{2}{5} \times 100 = 40\%$

4. Increase or Decrease as Percent : There are times when we need to know what the increase in a certain quantity or decrease in it is as percent.

For example, if the population of a state is increased from 5,50,000 to 6,05,000, this could more clearly be understood if written as:

The population is increased by 10%.

$$\text{Increase or decrease \%} = \frac{\text{changed amount}}{\text{original amount}} \times 100$$

Example 8. A cycle was costing Rs. 4500 last year, but this year it is costing Rs. 5000. Find the percentage increase in the price.

Solution. Original price = Rs. 4500

Rise in price = Rs. 5000 – Rs. 4500 = Rs. 500

Percentage increase = $\frac{500}{4500} \times 100 = \frac{100}{9} = 11 \frac{1}{9}\%$ Hence, the price has increased by $11 \frac{1}{9}\%$

Q. Price of orange per kilogram is Rs. 60 last year. This year orange price is Rs. 50 per kilogram. Find the percentage decrease in price. (Ans. $16 \frac{2}{3}\%$)

5. i) Finding Percentage of a Given Quantity To find a percentage of a given quantity, we must change the percentage into fraction and then multiply it by the given quantity.

Ex1. What is the value of 25% of 60?

Solution. 25% of 60 = $\frac{25}{100} \times 60 = \frac{60}{4} = 15$

ii) Expressing One Quantity as Percentage of another Quantity : To express one quantity as a percentage of another same quantity, we must divide one quantity with the other quantity and then multiply the result with 100.

Ex1. Express 25 as a percentage of 75. **Solution.** Percentage = $(\frac{25}{75} \times 100) \% = 33 \frac{1}{3} \%$

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6) Prices Related to an Item on Buying and Selling :

Cost Price: The buying price of an item is known as its cost price written in short as CP.

Selling Price: The price at which we sell an item is known as the selling price or in short SP.

Finding SP when CP and % or loss% given

$$\text{Selling Price: (S.P.)} \\ SP = \left[\frac{(100 + \text{Profit \%})}{100} \times \text{C.P.} \right]$$

$$\text{Selling Price: (S.P.)} \\ SP = \left[\frac{(100 - \text{Loss \%})}{100} \times \text{C.P.} \right]$$

profit

Finding CP when SP and profit % loss% given

$$\text{Cost Price: (C.P.)} \\ C.P. = \left[\frac{100}{(100 + \text{Profit \%})} \times \text{S.P.} \right]$$

$$\text{Cost Price: (C.P.)} \\ C.P. = \left[\frac{100}{(100 - \text{Loss \%})} \times \text{S.P.} \right]$$

or

7) Profit or Loss as a Percentage

i) **Profit or Loss:** We can decide whether the sale was profitable or not depending on the CP and SP.

If $CP < SP$, then profit and $\text{profit} = SP - CP$

If $CP = SP$ then we are in a no profit no loss situation

If $CP > SP$ loss and t , $\text{Loss} = CP - SP$.

The profit or loss we find can be converted to a percentage. It is always calculated on the CP.

Note. If we are given any two of the three quantities related to price, that is, CP, SP, and Profit or Loss percent, we can find the third.

$$\text{Profit Percentage: (Profit \%)} \\ \text{Profit \%} = \left[\frac{\text{Profit} \times 100}{\text{C.P.}} \right]$$

$$\text{Loss Percentage: (Loss \%)} \\ \text{Loss \%} = \left[\frac{\text{Loss} \times 100}{\text{C.P.}} \right]$$

8. SIMPLE INTEREST: Charge has given on Borrowed Money are Simple Interest

Principal: The money borrowed is known as principal.

Interest: We have to pay some extra money (or charge) to the bank for the money being used by us for some time. This is known as interest.

Amount: We can find the amount we have to pay at the end of the year by adding the above two. That is.

Amount = Principal + Interest.

Note: Interest is generally given in per cents for a period of one year. It is written as x percent per year or per annum or in short as x% p.a. (say 10 percent per year)

10% p.a. means on every ₹ 100 borrowed, ₹ 10 is the interest we have to pay for one year.

PRACTICE EXERCISE

1) 72% of 25 students are good in Mathematics, how many are not good in Mathematics?

a) 16 b) 14 c) 18 d) 7 (Ans1. 18)

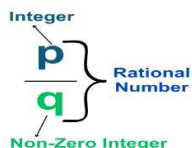
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- 2) Arun bought a toy for Rs. 750 and sold it for Rs.870. Find his gain or loss %?
a) 5% **b) 16%** c) 6% d) 162 (Ans2. 16%)
- 3) The cost of flower vase is Rs 120. If the shopkeeper sells it at a loss of 10%. Find the price at which it is sold.
a) Rs108 b) Rs450 c) Rs160 d) none of these (Ans. Rs. 108)
- 4) The simple Interest on Rs 5000 for 2 years at 4% per annum is _____.
a) Rs.300 **b) Rs.400** c) Rs.500 d) Rs.450 (Ans. Rs. 400)
- 5) A school has 220 working days. Shahin's attendance is 85%. How many days did he remain absent? (**Ans. 33 days**)
- 6) Mr. Aditya has Rs 96,400. He gave 42% of the money to his wife, 35% to his son and rest to his daughter. Find the share of each person. (Ans. wife- Rs.40488, son- Rs.33740 daughter-Rs,22172)
- 7) **Rs. 2000** is given at 9% per annum simple interest for 2 years. Find the interest which will be received at the end of two years. (Ans. S.I. = Rs.360.)
- 8) Express 500 grams as percentage of 2.5 kg. (Ans. 20%)
- 9) Find the value of 15% of Rs. 80.(Ans. Rs. 12)
- 10) **Q.** Express 5: 8 in percentage form. (Ans. 62.5%)

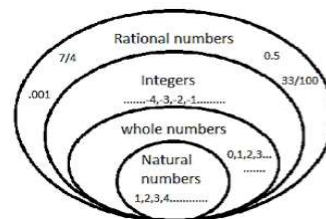
***** Refer TB and NB for practice and revision *****

CH4- RATIONAL NUMBER

Introduction to Rational Numbers



Rational number can be defined as a ratio or fraction ($\frac{P}{Q}$) form where numerator and denominator are integer and denominator (Q) should not be equal to zero.



Example: $\frac{5}{8}$ is an example of rational number as 5 and 8 are integers and $8 \neq 0$

In the same way $-\frac{11}{2}$, $\frac{9}{-2}$, $-\frac{43}{-7}$ are also rational number.

Positive Rational Number

When both the numerator and denominator are positive or negative integer then they are said to be Positive Rational Number.

Examples $-\frac{25}{-13}$ (can be written as $\frac{25}{13}$), $\frac{17}{19}$ etc.

Negative Rational Number

When one of the numerator or denominator is negative integer then they are said to be Negative Rational Number.

Example: $-\frac{25}{27}$, $\frac{15}{-17}$ etc.

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- If both the numerator and denominator of a rational number is either positive or negative, then multiplying -1 to numerator or denominator will convert the rational number to negative.
- If any of the numerator or denominator of a rational number is negative, then multiplying -1 to the negative part of the numerators or denominator will convert the rational number to positive.

Example: $\frac{3}{5} = \frac{(3 \times (-1))}{5} = \frac{-3}{5}$
 $\frac{-6}{15} = \frac{((-6) \times (-1))}{15} = \frac{6}{15}$

Properties of Rational Number

1. Every integer is a rational number but every rational number is not an integer.
e.g. $\frac{7}{9}$ is a rational number and $9 \neq 0$ but $\frac{7}{9}$ not an integer.
e.g. $\frac{-7}{9}$ is a rational number and $9 \neq 0$ but $\frac{-7}{9}$ not an integer.
2. Every natural number and whole number is also an integer and so a rational number.
3. zero (0) is also a rational number but it is neither positive nor negative.

Comparison of Rational Number

Before comparing the rational numbers, we must remember the following points:

1. Every positive rational number is greater than 0 and every negative number. $\frac{9}{5} > 0$, $\frac{9}{5} > \frac{-3}{2}$
2. Every negative rational number is less than 0 and every positive number. $\frac{-3}{3} < 0$, $\frac{-5}{3} < \frac{132}{3}$
3. Zero is greater than every negative number and smaller than every positive number. $\frac{4}{18} > 0 > \frac{-4}{18}$

Example 1. Compare $\frac{5}{7}$ and $\frac{-2}{5}$

Solution. As we know Every positive rational number is greater than every negative number.
 $\frac{5}{7} > \frac{-2}{5}$.

Example 2. Compare $\frac{-1}{2}$ and $\frac{-5}{4}$

Solution. Here both are negative rational number having different denominators. So, we have to make both the denominators same.

$$\frac{-1}{2} = \frac{(-1 \times 2)}{(2 \times 2)} = \frac{-2}{4}$$

Then compare the rational number of same denominators.

$$\frac{-2}{4} > \frac{-5}{4}$$
$$\frac{-1}{2} > \frac{-5}{4}$$

Addition of Rational Number

When the denominators are equal:

- By keeping the denominators same simply add the numerators.
- Simplify the result if possible.

Example 1. Add $\frac{2}{5}$ and $\frac{3}{5}$

Solution. $\frac{2}{5} + \frac{3}{5}$
 $= \frac{(2+3)}{5}$
 $= \frac{5}{5}$
 $= 1$

Example 2. Add $\frac{5}{9}$ and $\frac{-4}{9}$

Solution. $\frac{5}{9} + \frac{-4}{9}$
 $= \frac{(5+(-4))}{9}$

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$$= \frac{(5-4)}{9}$$
$$= \frac{1}{9}$$

When the denominators are unequal:

- Find out LCM of the denominators of the given rational numbers.
- Convert the given rational numbers to have LCM as the common denominator.
- Add the newly converted rational numbers by following the process of equal denominators

Example 1. Add $\frac{-4}{5}$ and $\frac{7}{2}$

Solution. $\frac{-4}{5} + \frac{7}{2}$

LCM of 5 and 2 is 10.

$$\frac{-4}{5} = \frac{-4 \times 2}{5 \times 2} = \frac{-8}{10}$$

$$\frac{7}{2} = \frac{7 \times 5}{2 \times 5} = \frac{35}{10}$$

Now, add $\frac{-8}{10}$ and $\frac{35}{10}$.

$$\frac{-8}{10} + \frac{35}{10}$$
$$\frac{(-8+35)}{10} = \frac{27}{10}$$

Subtraction of Rational Number

When the denominators are equal:

By keeping the denominators same simply subtract the numerators. Simplify the result if possible.

Example 1. Subtract $\frac{2}{5}$ from $\frac{3}{5}$

Solution. $\frac{3}{5} - \frac{2}{5}$

$$= \frac{(3-2)}{5}$$

$$= \frac{1}{5}$$

Example 2. Subtract $\frac{-2}{7}$ from $\frac{3}{7}$

Solution. $\frac{3}{7} - \frac{-2}{7}$

$$= \frac{(3-(-2))}{7}$$

$$= \frac{(3+2)}{7}$$

$$= \frac{5}{7}$$

When the denominators are unequal:

- Find out LCM of the denominators of the given rational numbers.
- Convert the given rational numbers to have LCM as the common denominator.
- Subtract the newly converted rational numbers by following the process of equal denominators

Let's see some examples.

Example 1. Subtract $\frac{4}{5}$ from $\frac{7}{2}$

Solution. $\frac{7}{2} - \frac{4}{5}$

LCM of 5 and 2 is 10.

$$7/2 = 7 \times 5 / 2 \times 5 = 35/10$$

$$4/5 = 4 \times 2 / 5 \times 2 = 8/10$$

Now, subtract $35/10$ from $8/10$.

$$35/10 - 8/10$$

$$(35-8)/10 = 27/10$$

Multiplication of Rational Number

- Multiply the numerators of given rational numbers and the product becomes numerator
- multiply the denominators of given rational numbers and the product becomes denominator of the result
- Simplify the result if possible

Let's consider a/b and c/d are two rational numbers.

$$a/b \times c/d = (ac)/(bd)$$

Example 1. Multiply $4/5$ and $2/7$.

Solution. $4/5 \times 2/7$

$$= (4 \times 2) / (5 \times 7)$$

$$= 8/35$$

Example 2. Multiply $-5/9$ and $3/5$.

Solution. $-5/9 \times 3/5$

$$= (-5 \times 3) / (9 \times 5)$$

$$= -15/45$$

$$= -1/3$$

Reciprocal of Rational Number

When the product of two rational number is 1 then each one is called the reciprocal of other. In other words a/b rational number reciprocal is b/a .

Let's see some examples.

Example 1. Find the reciprocal of $4/5$. Ans. $5/4$

Example 2. Find the reciprocal of $1/9$. Ans. $-9/7$

Division of Rational Number

If P/Q and R/S are two rational number to be divided, then multiply P/Q with reciprocal of R/S i.e. S/R .

Let's see some examples.

TALENT SEARCH STUDY MATERIAL – CLASS VII

Example 1. Divide $\frac{4}{5}$ by $\frac{2}{5}$.

Solution. $\frac{4}{5} \div \frac{2}{5}$

Reciprocal of $\frac{2}{5} = \frac{5}{2}$

Now, $\frac{4}{5} \times \frac{5}{2} = 2$ ans.

Example 2. Divide $\frac{3}{7}$ by $-\frac{5}{14}$.

Solution. $\frac{3}{7} \div -\frac{5}{14}$

Reciprocal of $-\frac{5}{14} = \frac{14}{5} = -\frac{14}{5}$

Now $\frac{3}{7} \times -\frac{14}{5} = -\frac{6}{5}$ ans.

More examples:

-> The rational number 0.75 can be written in standard form as $\frac{3}{4}$

-> The rational number -1.5 can be written in standard form as $-\frac{3}{2}$

-> The rational number 7 can be written in standard form as $\frac{7}{1}$.

Equivalent Rational numbers:

By multiplying or dividing the numerator and denominators by same integers we can obtain another rational number.

Example. Find equivalent fraction of $\frac{1}{2}$

$$\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$$

Thus $\frac{2}{4}$ is equivalent to $\frac{1}{2}$.

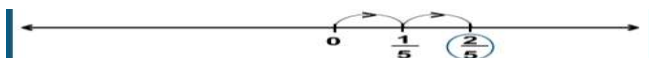
Practice questions: Q1. Find equivalent rational numbers of $\frac{2}{3}$ and $\frac{1}{7}$.

Q 2. Fill in the blanks $\frac{5}{4} = \frac{?}{16} = \frac{25}{?} = -\frac{15}{?}$ (Ans. 20/16 , 25/20 , 15/12)

Rational Numbers on the Number Line:

On the number line, rational numbers are the numbers that can be expressed as a fraction of two integers. This includes both positive and negative numbers, as well as decimals that can be expressed as a fraction.

Example:



To put $\frac{2}{5}$ on the number line, follow these steps:

1. Divide the number line into equal parts: Start by dividing the number line into 10 equal parts, each representing $\frac{1}{5}$. You can use a ruler or a straight edge to draw the divisions.

2. Locate $\frac{2}{5}$: To locate $\frac{2}{5}$, count four parts from 0 on the number line. You will find $\frac{2}{5}$.

3. Place a circle: Place a circle on the second part of the number line to represent $\frac{2}{5}$.

The number line needs to be marked with a circle at the position corresponding to $\frac{2}{5}$, indicating its placement on the number line.

Rational Numbers in Standard Form

A rational number is said to be in the standard form if its denominator is a positive integer and the numerator and the denominator have no common factor other than 1. Note that the negative sign occurs only in the numerator.

A rational number in **standard form is said to be in its lowest form.**

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Q3. Find standard form of i) $\frac{12}{18}$ ii) $-\frac{18}{45}$

Q4. Reduce $-\frac{3}{-15}$ and $\frac{36}{-24}$ to the standard form.

Positive and Negative Rational Numbers

---- If both the numerator and denominator are either positive or negative integers, then they are said to be a positive rational number.

---- A rational number is said to be negative if its numerator and denominator are such that one of them is a positive integer and the other is a negative integer.

----Zero is neither positive nor negative rational numbers.

Example: i) is 5 a positive rational number?

Yes! 5 can be written as $\frac{5}{1}$, where numerator and denominator both have same sign so it is a positive rational number.

Comparison of Rational Numbers

- Two positive rational numbers can be compared exactly as we compare two fractions.
- Two negative rational numbers can be compared by ignoring their negative signs and then reversing the order.
- Comparison of a negative and a positive rational number is obvious as a negative rational number is always less than a positive rational number.

Q5. Compare $-\frac{7}{5}$ and $-\frac{5}{3}$

Q6. Do $\frac{4}{-9}$ and $-\frac{16}{36}$ represent the same rational number?

Q7. Write the following rational numbers in ascending and descending order $\frac{-13}{18}, \frac{7}{-9}, \frac{1}{5}, \frac{5}{6}, \frac{11}{15}$

Q8. Which is greater in each of the following i) $-\frac{2}{7}$ and $\frac{5}{-9}$ ii) $\frac{3}{7}$ and $\frac{2}{3}$

Rational Numbers between Two Rational Numbers: There exist an unlimited number of rational numbers between any two rational numbers.

Example - Find out ten rational numbers lying between $-\frac{3}{11}$ and $\frac{8}{11}$.

Solution: Since denominator is same then we will observe numerators and we know that between -3 and 8 there are $-3 < -2 < -1 < 0 < 1 < 2 < 3 < 4 < 5 < 6 < 7 < 8$

Therefore, $-\frac{2}{11}, -\frac{1}{11}, 0, \frac{1}{11}, \frac{2}{11}, \frac{3}{11}, \frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}$

Hence, $-\frac{2}{11}, -\frac{1}{11}, 0, \frac{1}{11}, \frac{2}{11}, \frac{3}{11}, \frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}$ are the ten rational numbers lying between $-\frac{3}{11}$ and $\frac{8}{11}$.

Q9. List three rational number between (-2) and (-1)

Q10. Find five rational numbers between $(-\frac{5}{7})$ and $(-\frac{3}{8})$

TALENT SEARCH STUDY MATERIAL – CLASS VII

Operations on Rational Numbers

Addition: Two rational numbers with the same denominators can be added by adding their numerators, keeping the denominator same.

Add the following rational numbers $\frac{2}{11}$ and $\frac{7}{5}$

LCM of 11 and 5 is $11 \times 5 = 55$

$$\text{Here, } \frac{2}{11} = \frac{2 \times 5}{11 \times 5} = \frac{10}{55} \quad \text{and} \quad \frac{7}{5} = \frac{7 \times 11}{5 \times 11} = \frac{77}{55}$$

$$\text{Now } \frac{2}{11} + \frac{7}{5} = \frac{10}{55} + \frac{77}{55} = \frac{10+77}{55} = \frac{87}{55} = 1\frac{32}{55}$$

$$\text{Q11. } \frac{7}{12} + \frac{-3}{5} \quad \text{ans. } (-1/60) \quad \text{Q12. Add } \frac{1}{-6} + \frac{-11}{16} \quad \text{ans: } (41/48)$$

Additive Inverse : The additive inverse of the rational number p is $-p$. Sum of a rational number and its additive inverse is always 0.

Subtraction While subtracting two rational numbers, we add the additive inverse of the rational number to be subtracted to the other rational number.

Example:

$$\text{Subtract } \frac{15}{9} \text{ from } \frac{4}{9} = \frac{4}{9} - \frac{15}{9} = \frac{(4-15)}{9} = -\frac{11}{9} = \left(-1\frac{2}{9}\right) \text{ Ans.}$$

Q12. Subtract

$$5\frac{4}{9} \text{ from } 7 \quad \text{ans} \left(1\frac{5}{9}\right)$$

$$\text{ans: Q13. Evaluate } \frac{1}{8} - 37$$

$$\text{ans } \frac{31}{56}$$

Multiplication of rational numbers

Product of two rational number = $\frac{\text{(Product of numerators)}}{\text{product of denominators}}$

$$\text{Example. Multiply } (-2/5) \text{ by } 3 = \frac{-2}{5} \times 3 = \frac{-2 \times 3}{5} = \frac{-6}{5}$$

Division of rational numbers : To divide a rational numbers by another rational number we have to multiply the reciprocal of the rational number with the other rational number.

The reciprocal of the rational number p/q is q/p

Example Divide $2/3$ by $3/4$

$$= \frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$$

Product of Reciprocals:

The product of a rational number with its reciprocal is always 1.

** Refer T.B. and class notes also

7 Revision exercise Rational Numbers

1. What is the reciprocal of -18 ?
(Ans1. a)

a) $-1/18$

b) $-33/9$

c) 0

d) -1

2. $\frac{\quad}{\quad} \div \frac{2}{3} = \frac{7}{20}$.
(Ans1. a)

a) $14/60$

b) $-33/9$

c) 0

d) 13

3. $-2\frac{1}{9} - 6 = ?$
(Ans3. a)

a) $-73/9$

b) $-33/9$

c) 6

d) None of these

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4. Write $\frac{5}{9}$ in standard form. a) $-\frac{5}{9}$ b) 0 c) $\frac{3}{8}$ d) $\frac{53}{8}$
(Ans.4 a)
5. Write the standard form of $\frac{64}{44}$. a) $1\frac{1}{2}$ b) $\frac{16}{11}$ c) $\frac{32}{22}$ d) 0
(Ans5. b)
6. Simplify $\frac{9}{-16} + \frac{-5}{-12}$. a) $\frac{3}{2}$ b) $-\frac{33}{9}$ c) **7/48** d) $-\frac{19}{54}$
(Ans6. c)
7. $-\frac{3}{8} \times 0 = \underline{\hspace{2cm}}$. a) 1 b) 1.5 c) **0** d) 2
(Ans7. c)
8. The sum of two rational number is $-\frac{3}{8}$. If one number is $\frac{3}{16}$, then find the other.
a) $-\frac{9}{16}$ b) 0 c) 1 d) $\frac{2}{8}$
(Ans8. a)
9. What should be added to $-\frac{7}{8}$ to get $\frac{4}{9}$? a) 1 b) $-\frac{33}{9}$ c) 0 d) $\frac{95}{72}$
(Ans9. d)
10. The product of two rational number is 10. If one numbers is -8 , then find the other.
a) 1 b) $-\frac{5}{4}$ c) 0 d) $\frac{5}{2}$
(Ans10. b)

Logical Reasoning:

Logical reasoning consists of aptitude questions that require a logical level of analysis to arrive at the correct solution. Most of the questions are constructed based on concepts and the rest are out of the box thinking ones.

Steps To Solve Logical Reasoning Based Questions

1. Read and understand the information carefully.
2. Analyze critical logical information.
3. Think of all the viable solutions.
4. Compare the answer obtained with other possibilities.
5. Come to a correct logical conclusion.

1. Look at this series: 2, 1, (1/2), (1/4), ... What number should come next?

- a). (1/3) (b)(1/8) c) (2/8) (d)(1/16)

Solution: (b)

It's a division series. Every number is half of the previous number. The number is divided by 2 successively to get the next result. $4/2 = 2$. $2/2 = 1$. $1/2 = \frac{1}{2}$. $(1/2)/2 = \frac{1}{4}$. $(1/4)/2 = \frac{1}{8}$ and so on

.2. Look at this series: 80, 10, 70, 15, 60, ... What number should come next?

- (a) 20 (b)25 (c)30 (d) 50

Solution: (a).

This is an alternating addition and subtraction series. In the first pattern, 10 is subtracted from each number to arrive at the next. In the second, 5 is added to each number to arrive at the next.

3. SCD, TEF, UGH, _____, WKL

- (a)CMN (b)UJI (c)VIJ (d)IJT

Solution: (c)

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There are two alphabetical series here. The first series is with the first letters only: STUVW. The second series involves the remaining letters: CD, EF, GH, IJ, KL.

4. Look at this series: 53, 53, 40, 40, 27, 27, ... What number should come next?

- (a) 12 (b) 14 (c) 27 (d) 53

Solution: (b)

In this series, each number is repeated, then 13 is subtracted to arrive at the next number.

5. Look at this series: 9 11 33 13 15 33 17.... What numbers should come next?

- (a) 19 33 (b) 33 35 (c) 33 19 (d) 15 33

Solution: (a)

In this alternating repetition series, a random number, 33, is interpolated every third number into a simple addition series, in which each number increases by 2.

Mental Math:

Mental math is, in a nutshell, the act of solving math problems in your head! As learners progress, they will be expected to gradually solve more and more complex problems, so it's important that the techniques and skills that they use to achieve this are mastered at an early age.

1. An accurate clock shows 8 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

- (a) 144° (b) 150° (c) 168° (d) 180°

Solution: (d)

Explanation:

Angle traced by the hour hand in 6 hours =	$\left(\frac{360}{12} \times 6\right)^\circ$	= 180°.
--	--	---------

2. Which one of the following is not a prime number?

- (a) 31 (b) 61 (c) 71 (d) 91

Solution: (d)

Explanation:

91 is divisible by 7. So, it is not a prime number.

3. Find $617 + 6.017 + 0.617 + 6.0017 = ?$

- (a) 6.2963 (b) 62.965 (c) 629.6357 (d) None of these

Solution: (c)

4. The sum of the two numbers is 11 and their product is 30, then the numbers are _____

- (a) 8, 3 (b) 9, 2 (c) 7, 4 (d) 6, 5

Solution: (d)

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5. The sum of first five prime numbers is:

- (a) 7 (b) 11 (c) 18 (d) 28

Solution: (d)

Patterns in Math's

What are Patterns in Mathematics?

In mathematics, a pattern is a sequence of numbers that are formed in a particular way. Every pattern contains a specific rule. For example, the sequence of even numbers is a pattern since each number is obtained by adding 2 to the previous number.

i.e., 2, 4, 6, 8, 10, 12, 14,.....

Here, $2 + 2 = 4$

$4 + 2 = 6$

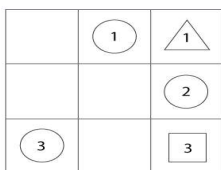
$6 + 2 = 8$

$8 + 2 = 10$ and so on.

Puzzles in Mathematics

A mathematical puzzle is a type of problem or game that involves using mathematical concepts, logic, and reasoning to find a solution. These puzzles often require creative thinking and a deep understanding of mathematical principles to solve.

Which 4 shapes and number combinations are needed to complete the shape box ?



In each row all three shapes are there in first row 1 square, 2nd row one square and one triangle with 2 inside and in third row one triangle is missing

Practice Questions:

1. Observe the below figure and identify the missing part.

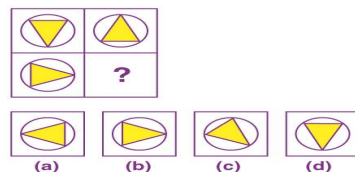
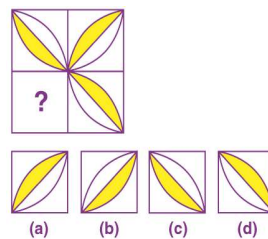
- i) a ii) b iii) c iv) d

Ans.(ii)

2. Observe the following figure and choose the correct option.

- i) a ii) b iii) c iv) d

Ans.(i)



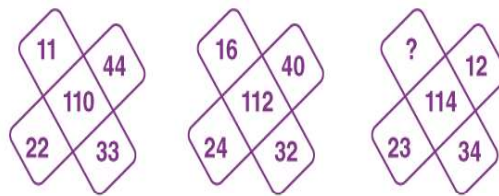
3. Observe the pattern given below. Find the missing number.

TALENT SEARCH STUDY MATERIAL – CLASS VII

- i) 21 ii) 25 iii) 45 iv) 36

Ans.(iii)

Hints the given figure, we can observe that the sum of the four numbers is equal to the number written in the middle of the shape.



4. What will be the next number of the given sequence? 1, 5, 12, 22, 35, ?

- i) 15 ii) 16 iii) 18 iv) 19

Ans.(iv)

Hints: Let's write the difference between consecutive numbers.

$$5 - 1 = 4$$

$$12 - 5 = 7$$

$$22 - 12 = 10$$

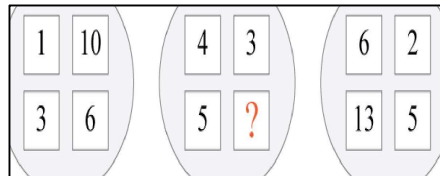
$$35 - 22 = 13$$

$$35 - ? = 16$$

5. Which number completes the sequence?

- i) 10 ii) 11 iii) 12 iv) 15

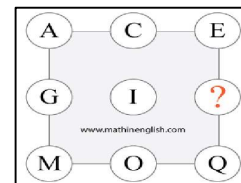
Ans.(iii)



6. What is the missing letter in the following letter sequence?

- i) k ii) D iii) F iv) H

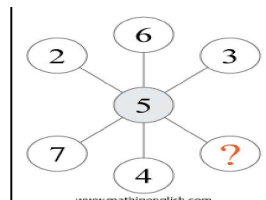
Ans.(i) Hint: The letter value increased by 2 each next cell



7. What is the missing number in this puzzle?

- i) 1 ii) 9 iii) 8 iv) 10

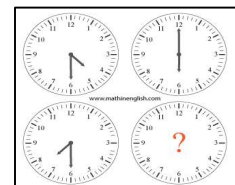
Ans.(iii)



8. What time is it on the 4th clock?

- i) 6.30 ii) 12.30 iii) 8 iv) 9

Ans.(iv)



9. What kind of pattern in this 88,77 ,66, 55, 44, 33.

- i) growing ii) shrinking iii) natural iv) repeating **Ans.(ii)**

10. What type of pattern rule is this? 500, 100, 20

TALENT SEARCH STUDY MATERIAL – CLASS VII

- i) division by 5 ii) division by 10 iii) division by 50 iv) division by 2 **Ans.(i)**

ODD ONE OUT

Odd one out is a phrase that is commonly used in mathematics where one number or value in a group is different from the others. The first step is to identify the common characteristics or relationships shared by the group. The second step is to check each option and find the one that do not display the relation. Picking the "Odd one out" is an activity designed to develop a learner's observation, application, and analytical skills.

Example 1: Which one is the odd one out?

- a) 40 b) 60 c) 90 d) 100

Answer: d) 100 (It is the only number that is a perfect square.)

Example 2: Which number is the odd one out?

- a) 9862 b) 4377 c) 8454 d) 9831

Answer: a) 9862 (Sum of the digits of all other numbers is 21, but sum of the digits 9862 is 25)

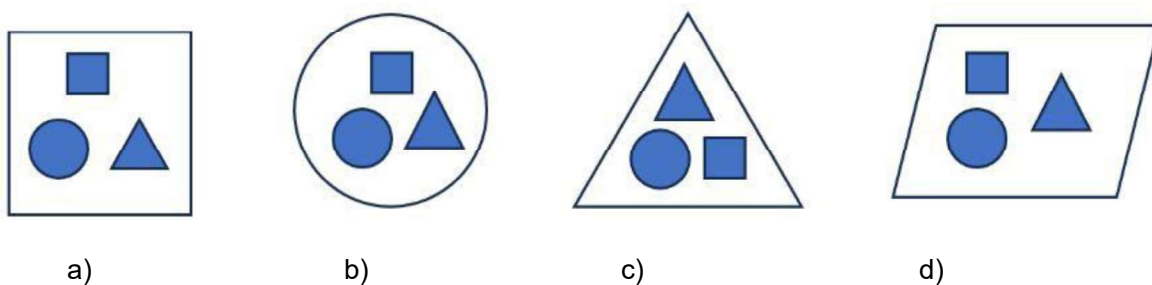
Example 3: Which alphabet is the odd one out



Answer: c) All the other letters have rounded or curved segments in their designed

While E has straight lines and angles

Example 4: Look at the given figures and find the odd one out:



Answer: d) In each of the figure, one of the inner shapes is same as the outer shape and the rest two of the shapes are different, except in (d), where there is no parallelogram as the inner shape.

Example 5: Pick the odd ones out from the given fractions:

- a) $\frac{2}{3}$ b) $\frac{6}{11}$ c) $\frac{8}{7}$ d) $\frac{1}{5}$

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Answer: c) The odd one out is $\frac{8}{7}$, as it is an improper fraction.

BASIC GEOMETRICAL CONCEPT

Geometry is the branch of mathematics that deals with shapes, angles, figures, dimensions, and sizes of a variety of things we see in everyday life,

The word Geometry is derived from the Greek word 'geometron' is made of two words 'Geo' means 'Earth' and 'Metron' means 'measurement'.

In a plane geometry two dimensional shapes such as triangles, squares, rectangles, circles are also called flat shapes. In solid geometry, three dimensional shapes such as cube, cuboid, cylinder, cone ...etc. are also called solid shapes.

Basic Geometry terms: Point, line, line segment, ray, vertex, angle, collinear points, non collinear points, intersecting lines, parallel lines, perpendicular lines.

Q1) A polygon with four sides is called a _____

Ans) Quadrilateral

Q2) The point where two lines meet to form an angle is called the _____.

Ans) Vertex

Q3) The distance around a circle is called its _____.

Ans) Circumference

Q4) If three or more points do not lie on a single straight line, they are called _____ points.

Ans) Non-collinear points

Q5) An angle which measures more than 180° but less than 360° is called a _____.

Ans) Reflex angle

Q6.)An angle divides a plan in how many regions

a)2 b)3 c)4 d)5

Ans) (b)

Q7) If a bicycle wheel has 36 spokes, then the angle between a pair of two consecutive spokes are _____.

Ans. 10°

SUBJECT: SCIENCE & TECHNOLOGY

RESPIRATION IN ORGANISMS

Respiration is a vital biological process in all living organisms, enabling the release of energy from food molecules for various cellular activities.

1. DEFINITION: The biochemical process where organisms convert glucose or other organic substances into energy.

2. TYPES OF RESPIRATION:

Aerobic Respiration: Requires oxygen; produces carbon dioxide, water, and a high yield of energy (ATP).

Equation: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy (ATP)}$

Anaerobic Respiration: Occurs without oxygen; yields less energy and produces byproducts like lactic acid (in animals) or ethanol and carbon dioxide (in some microorganisms).

Equation (in animals): $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3 + \text{Energy (ATP)}$

3. ROLE OF RESPIRATION:

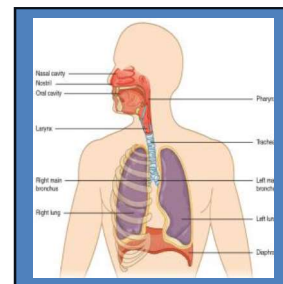
Provides ATP (adenosine triphosphate), the energy currency of cells.
Fuels vital processes like movement, growth, reproduction, and repair

4. STAGES OF AEROBIC RESPIRATION:

Glycolysis: Occurs in the cytoplasm, breaks glucose into two molecules of pyruvate; generates 2 ATP.

Krebs Cycle (Citric Acid Cycle): Takes place in the mitochondria; generates electron carriers like NADH and FADH₂.

Electron Transport Chain (ETC): Occurs on the inner mitochondrial membrane; produces the majority of ATP via oxidative phosphorylation.



5. ORGAN SYSTEMS AND RESPIRATION:

Humans and Animals: Lungs or gills extract oxygen from the environment; circulatory transport systems oxygen to cells.

Plants: Respiration occurs in all cells, primarily in mitochondria; gases exchange via stomata.

Microorganisms: Diverse respiration mechanisms, including fermentation (anaerobic).

6. DIFFERENCES BETWEEN RESPIRATION AND BREATHING:

Respiration: Cellular process producing energy.

Breathing: Physical act of inhaling oxygen and exhaling carbon dioxide in animals.

7. ADAPTATION FOR RESPIRATION:

Aquatic organisms: Gills or specialized respiratory surfaces.

Terrestrial organisms: Lungs, tracheal systems, or skin (amphibians).

Microorganisms: Cell membrane or cytoplasm for gas exchange.

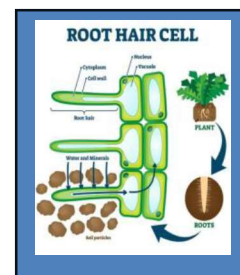
8. FACTORS AFFECTING RESPIRATION:

Temperature: Enzymes involved in respiration are temperature sensitive.

Oxygen Availability: Critical for aerobic processes

Type of Organism: Determines whether aerobic or anaerobic respiration predominates.

Energy Demands: Higher activity levels increase respiration rates.



Respiration is fundamental to life, driving the metabolic processes necessary for survival and adaptation in diverse environments.

TALENT SEARCH STUDY MATERIAL – CLASS VII

TRANSPORTATION IN ANIMALS AND PLANTS

Transportation is a crucial biological process that enables the movement of essential substances like water, nutrients, gases, and waste products within organisms. Both animals and plants have specialized systems to facilitate this process, ensuring their survival and proper functioning.

TRANSPORTATION IN ANIMALS:

In animals, transportation involves the circulatory system, which ensures the efficient delivery of oxygen, nutrients, and hormones to cells, as well as the removal of waste products.

1. CIRCULATORY SYSTEM:

Definition: A network of heart, blood vessels, and blood responsible for transporting substances throughout the body.

TYPES: Open Circulatory System: Blood flows freely in the body cavity. (e.g., e.g. Insects).

Closed Circulatory System: Blood is confined to vessels. (e.g., humans, fish).

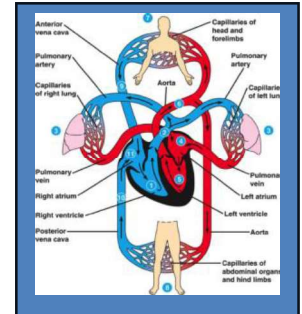
2. COMPONENTS OF THE CIRCULATORY SYSTEM:

1: Heart:

A muscular organ that pumps blood.

Humans have a four-chambered heart: two atria and two ventricles.

It maintains blood flow through pulmonary (lungs) and systemic (body) circuits.



2. Blood Vessels:

Arteries: Carry oxygenated blood away from the heart (except pulmonary artery).

Veins: Carry deoxygenated blood back to the heart (except pulmonary veins).

Capillaries: Thin-walled vessels where exchange of gases, nutrients, and waste occurs.

3. Blood:

Transports oxygen (via RBCs), nutrients, hormones, and waste products. Includes plasma, red blood cells, white blood cells, and platelets.

4. Lymphatic System:

A secondary transport system that carries lymph, a fluid containing white blood cells and waste products, and plays a role in immunity.

TRANSPORTATION IN PLANTS: -

In plants, transportation occurs through specialized tissues that move water, minerals, and food.

1. Vascular System:

1. Xylem: Transports water and dissolved minerals from roots to leaves.

Uses processes like root pressure, capillary action, and transpiration pull.

2. Phloem: Transports food (mainly sucrose) from leaves to other parts of the plant. Utilizes the pressure-flow hypothesis for movement.

2. Mechanisms of Transportation:

1. Transport of Water and Minerals:

Water is absorbed by roots through root hairs via osmosis.

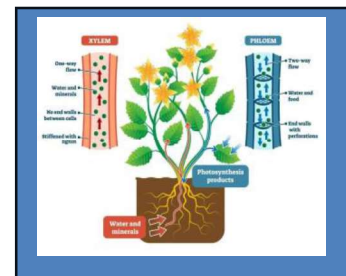
Minerals are absorbed as ions through active transport.

Water moves upward through the xylem due to:

Root Pressure: Pushes water up from the roots.

Capillary Action: Pulls water up through narrow xylem tubes.

Transpiration Pull: Evaporation of water from leaf surfaces creates a suction force.



TALENT SEARCH STUDY MATERIAL – CLASS VII

2. Transport of Food (Translocation):

Sugars produced during photosynthesis in leaves are transported to storage organs and growing parts.

This movement is bidirectional and requires energy (active transport).

3. Transpiration

The loss of water vapor from leaves through stomata.

Helps in creating the transpiration pull, cooling the plant, and facilitating mineral transport.

COMPARISON BETWEEN ANIMAL AND PLANT TRANSPORTATION

Aspect	Animals	Plants
Transport Medium	Blood and lymph	Water and sap
Structures Involved	Heart, blood vessels, lymphatic vessels	Xylem and phloem
Driving Force	Heartbeat and muscle contractions	Transpiration pull and pressure gradients
Transport Direction	Mostly circular loops	Unidirectional in xylem, bidirectional in phloem
Nutrient Distribution	Blood delivers nutrients to cells	Phloem transports food

Both systems are designed to ensure efficient transport tailored to the needs of animals and plants, supporting growth, reproduction, and survival.

REPRODUCTION IN PLANTS

Reproduction in plants is the biological process by which plants produce offspring, ensuring the continuation of their species. Plants reproduce through two main modes: **asexual reproduction** and **sexual reproduction**.

1. ASEXUAL REPRODUCTION

Asexual reproduction involves a single parent and produces genetically identical offspring (clones). There is no fusion of gametes in this process.

TYPES OF ASEXUAL REPRODUCTION:

1. Vegetative Propagation:

New plants grow from vegetative parts like roots, stems, or leaves.

Examples: **Roots:** Sweet potato.

Stems: Ginger, potato (tubers), and strawberries (runners).

Leaves: Bryophyllum (new plants grow from leaf margins).

2. Fragmentation:

The plant body breaks into fragments, and each fragment develops into a new plant. (e.g., algae like Spirogyra).

3. Budding:

A small bud develops on the parent plant and grows into a new individual. (e.g., yeast in unicellular plants).

4. Spore Formation:

Spores, tiny reproductive units, are released into the environment, where they germinate under favorable conditions (e.g., fungi and mosses).

2. Sexual Reproduction

Sexual reproduction involves the fusion of male and female gametes, resulting in genetically diverse offspring. It occurs in flowering plants (angiosperms) and non-flowering plants.

STEPS IN SEXUAL REPRODUCTION:

1. Pollination:

Transfer of pollen grains from the anther (male part) to the stigma (female part).

Types of pollination

Self-pollination: Pollen from the same flower or plant.

Cross-pollination: Pollen from one plant to another.

Pollinators include wind, water, insects, and animals.

2. Fertilization:

Pollen grain germinates on the stigma, forming a pollen tube that reaches the ovule.

Male gamete fuses with the female gamete (egg) in the ovule to form a zygote.

3. Seed and Fruit Formation:

The zygote develops into an embryo, while the ovule forms the seed.

The ovary matures into the fruit.

Examples:

Flowers with both reproductive organs (bisexual flowers): Hibiscus.

Flowers with separate male and female organs (unisexual flowers): Papaya and cucumber.

3. Importance of Reproduction in Plants

Survival and Continuity: Ensures the survival of species.

Genetic Variation: Sexual reproduction promotes diversity, aiding adaptation.

Economic Importance: Provides seeds, fruits, and other plant products for human use.

Propagation: Helps in natural and artificial cultivation of plants.

4. Artificial Methods of Reproduction

Humans use artificial techniques to propagate plants for agriculture and horticulture:

1. **Cutting:** Propagation using parts of plants like stems (e.g., rose).
2. **Grafting:** Joining parts of two plants (e.g., mango).
3. **Tissue Culture:** Growing plants from cells in a nutrient medium under sterile conditions.

TALENT SEARCH STUDY MATERIAL – CLASS VII

Understanding plant reproduction not only highlights the complexity of life processes but also enables advancements in agriculture, biodiversity conservation, and food security.

Recent research in plant reproduction has revealed several fascinating advancements:

1. **Genetic Mechanisms of Self-Incompatibility:** Scientists have developed new models to understand self-incompatibility, a genetic process in many flowering plants that prevents self-fertilization and promotes genetic diversity. This discovery provides insights into how plants maintain biodiversity through cross-pollination.
2. **Embryogenesis Without Fertilization:** Researchers have identified key genes in rice that can trigger embryogenesis without the need for fertilization. This breakthrough has potential applications in agriculture, especially for enhancing crop yields and sustainability.
3. **Evolution of Reproductive Structures:** Studies on ancient flowering plants have offered clues about the evolution of reproductive strategies. For example, fossils and genetic studies reveal how plants adopt different mechanisms to ensure successful reproduction under varying environmental conditions.
4. **Role of Pollen Tubes and Ovules:** New research has clarified the communication between pollen tubes and ovules, which is crucial for fertilization. Discoveries about how signaling molecules guide the pollen tube have implications for improving pollination efficiency.

These findings not only deepen our understanding of plant reproduction but also hold promises for improving agricultural practices and conserving plant diversity in changing climates.

MOTION AND TIME

Motion and time are fundamental concepts in physics that describe the movement of objects and the measurement of events. They are interrelated and help us understand and predict the behavior of physical systems.

1.MOTION

Definition: Motion is the change in position of an object with respect to a reference point over time.

Types of Motion:

1. **Linear Motion:** Movement in a straight line e.g., a car on a highway).
2. **Circular Motion:** Movement along a circular path e.g., a satellite orbiting Earth).
3. **Oscillatory Motion:** Back-and-forth movement (e.g., a pendulum).

Key Terms in Motion:

- 1.Distance: Total path covered by an object (scalar quantity).
- 2.Displacement: Shortest straight-line distance between initial and final positions (vector quantity).
- 3.Speed: Rate of change of distance.
 $\text{Speed} = \text{Distance} / \text{Time}$
- 4.Velocity: Rate of change of displacement with direction.
 $\text{Velocity} = \text{Displacement} / \text{Time}$
- 5.Acceleration: Rate of change of velocity.
 $\text{Acceleration} = \text{Change in velocity} / \text{Time}$

2.TIME

Definition: Time is a measurable period during which events occur in a sequence.

Measurement:

Time is measured using clocks and watches.

Units include second (s), minutes (min), hours (h), and larger intervals like days and years.

Importance:

Time is essential for describing motion and understanding the dynamics of systems.

TALENT SEARCH STUDY MATERIAL – CLASS VII

3. RELATIONSHIP BETWEEN MOTION AND TIME

Motion is described using time as a reference. like distance-time and velocity-time provide insights into an object's movement:

Graphs

1. Distance-Time Graph:

A straight line indicates uniform motion.

A curve indicates accelerated or decelerated motion.

2. Velocity-Time Graph:

A horizontal line represents constant velocity.

A sloping line shows acceleration or deceleration.

4. UNITS AND MEASUREMENT

Standard Units (SI):

Motion: Measured in meters (m), kilometers (km), or miles.

Time: Measured in seconds (s).

Devices used for measuring motion and time include odometers, speedometers, and stopwatches.

5. APPLICATIONS

Daily Life:

Understanding vehicle speed and travel time.

Predicting arrival times and scheduling activities.

Science and Technology:

Space exploration and satellite launching.

Design machines and robotic systems.

Sports and Games:

Timing races and measuring athletic performance.

Understanding motion and time is crucial in physics and everyday life, enabling us to analyze movements, plan effectively, and predict future events. These concepts form the foundation for more advanced topics like mechanics, relativity, and kinematics.

LIGHT

Light is a form of energy that is essential for life on Earth. It plays a critical role in various natural and technological processes, including vision, photosynthesis, and communication.

1. NATURE OF LIGHT

Definition: Light is electromagnetic radiation that is visible to the human eye, typically within the wavelength range of 400 to 700 nanometers.

Dual Nature:

Wave-like Behavior: Exhibits properties like reflection, refraction, diffraction, and interference.

Particle-like Behavior: Consists of photons, discrete packets of energy.

2. SOURCES OF LIGHT

1. Natural Sources:

Sun: The primary source of natural light on Earth.

Stars: Emit light across vast distances.

Fire: Produces light through combustion.

Bioluminescence: Light produced by living organisms (e.g., fireflies, some marine organisms).

TALENT SEARCH STUDY MATERIAL – CLASS VII

2. Artificial sources:

Incandescent Bulbs: Emit light through a heated filament.

LEDs (Light-Emitting Diodes): Use semiconductors to produce light efficiently.

Lasers: Emit highly focused beams of coherent light.

3. PROPERTIES OF LIGHT:

1. Reflection:

Light bounces off surfaces, following the law of reflection.
(angle of incidence = angle of reflection).

2. Refraction:

Light bends as it passes from one medium to another, due to a change in speed
(e.g., bending of light in water).

3. Dispersion:

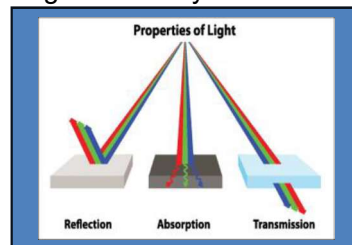
Splitting white light into its component colors (e.g., in a prism).

4. Diffraction:

Light bends around obstacles or spreads through small openings.

5. Polarization:

Light waves vibrate in a single plane.



4. IMPORTANCE OF LIGHT

1. For Vision:

Enables organisms to see by interacting with the eyes and brain.

2. Photosynthesis:

Plants use sunlight to produce food, releasing oxygen as a byproduct.

3. Energy Source:

Solar energy powers ecosystems and modern technologies like solar panels.

4. Communication:

Fiber optics use light to transmit data at high speeds.

5. Health:

Sunlight is essential for vitamin D synthesis in humans.



5. SPECTRUM OF LIGHT

Visible Spectrum:

Includes the colors violet, indigo, blue, green, yellow, orange, and red (VIBGYOR).

Violet has the shortest wavelength, and red has the longest.

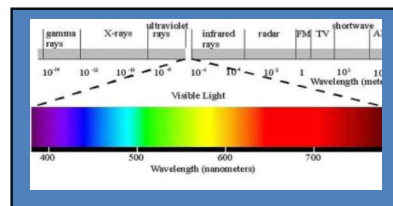
Beyond Visible Light:

Infrared: Longer wavelengths; used in thermal imaging.

Ultraviolet: Shorter wavelengths; important for sterilization but harmful in excess.

X-rays and Gamma Rays: Very short wavelengths with high energy; used in medicine and research.

Radio Waves and Microwaves: Longer wavelengths used in communication and cooking



6. APPLICATIONS OF LIGHT

Daily Life:

Lighting, photography, and visual entertainment.

Technology:

Lasers in surgery, data transmission in fiber optics, and holography.

TALENT SEARCH STUDY MATERIAL – CLASS VII

Scientific Research:

Telescopes and microscopes rely on light for exploration.

Environmental:

Solar power generation and greenhouse warming effects.

Light is fundamental to the universe, influencing life, science, and technology. Its study, known as optics, continues to unlock new possibilities and applications.

1. Quantum Dot Technology:

Description: Tiny semiconductor particles a few nanometers in size, having unique optical and electronic properties due to their quantum mechanics. They are used in display screens to produce pure, saturated colors, significantly enhancing display brightness and color range.

Application: TVs, smartphones, electronic devices.

2. Photonic Crystals:

Description: Materials structured on a scale comparable to the wavelength of light, allowing them to control the flow of light. By creating a photonic band gap, they can block specific wavelengths while allowing others to pass, enabling applications in optical fibers, lasers, and efficient LEDs.

Application: Quantum computing and telecommunications.

3. Aurora Borealis:

Description: Natural light displays predominantly seen in high-latitude regions. This phenomenon occurs due to solar wind (streams of charged particles from the sun) interacting with Earth's magnetic field and atmosphere. The collision of solar particles with atmospheric gases produces vivid colors in the sky, offering a stunning visual display and insights into solar-terrestrial interactions.

4. Organic Light-Emitting Diodes (OLEDs):

Description: Light-emitting diode in which the emissive layer is an organic compound. They offer significant advantages over traditional LEDs, including flexibility, thinner displays, and a broader viewing angle.

Application: TVs, smartphones, and wearable technology.

5. Photovoltaic Energy Advances:

Description: Advancements in photovoltaic technology to convert sunlight into electricity, leading to more sustainable and affordable solar energy solutions.

Application: New materials, innovative cell designs, and manufacturing techniques.

TECHNOLOGY

Technology refers to tools, machines, and methods used to make work easier, faster, or more efficient.

TYPES OF TECHNOLOGY

1. **Communication Technology:** Tools that allow people to interact and share information (e.g., mobile phones, video calls).

TALENT SEARCH STUDY MATERIAL – CLASS VII

2. **Energy Technology:** Systems used to produce energy (e.g., solar panels, wind turbines).
3. **Educational Technology:** Tools that improve learning experience (e.g., smart boards, online learning apps).
4. **Medical Technology:** Advances used in healthcare (e.g., MRI machines, fitness trackers).

COMPUTER SYSTEM

A **computer system** is made up of **hardware** and **software** working together.

Hardware: Physical parts of the computer.

- **Input devices:** Keyboard, mouse, microphone.
- **Output devices:** Monitor, speakers, printer.
- **Storage devices:** Hard disk, pen drive, memory card.

Software: Programs that run the hardware.

1. **System Software:** Helps with the computer function (e.g., Windows, macOS).
2. **Application Software:** Tools for users (e.g., MS Word, Paint, games).

DATA STORAGE UNITS

We store data in different units on a computer.

- **Bit:** Smallest unit of data (0 or 1).
- **Byte:** Equals 8 bits.
- **Kilobyte (KB):** 1,024 bytes.
- **Megabyte (MB):** 1,024 KB.
- **Gigabyte (GB):** 1,024 MB.

INTERNET AND ITS APPLICATIONS

The **Internet** connects millions of computers globally.

Applications of the Internet:

- Browsing for information.
- Sending emails or messages.
- Online shopping and banking.
- Watching videos and playing games.

Common Internet Terms:

- **URL:** Uniform Resource Locator (a website's address).
- **HTTP/HTTPS:** Protocols used to access the internet.
- **Web Browser:** Software for surfing the internet (e.g., Chrome, Firefox).

PROGRAMMING

- Programming is giving instructions to a computer to perform specific tasks using a language it can understand.

Examples of Programming Languages:

1. **Python:** Simple and beginner friendly.
2. **Java:** Used for apps and games.
3. **Scratch:** Visual programming for students.

ARTIFICIAL INTELLIGENCE (AI)

AI refers to computers or robots that can think, learn, and make decisions like humans.

Examples of AI:

- Voice Assistants (Alexa, Siri).
- Smart recommendations (YouTube, Netflix).
- Self-driving cars.

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EMERGING TECHNOLOGIES

- 1. Virtual Reality (VR):**
 - Technology that creates an interactive 3D virtual environment.
 - Example: VR headsets for gaming or learning.
- 2. Augmented Reality (AR):**
 - Adds virtual objects to the real world.
 - Example: Pokémon GO game.
- 3. 3D Printing:**
 - Creating real objects by layering materials.
 - Used in medical, education, and product design.
- 4. Blockchain:**
 - A secure system of recording information (used in crypto currency)

Common Internet & Computer Terms

- 1. URL** - Uniform Resource Locator
- 2. HTTP** - HyperText Transfer Protocol
- 3. WWW** - World Wide Web
- 4. ISP** - Internet Service Provider
- 5. PDF** - Portable Document Format

Famous Inventors and Inventions Of India	
Inventors Name	Inventions
Prafulla Chandra Ray	India's first pharmaceutical company.
Salim Ali	Naturalist who helped develop Ornithology
Srinivasa Ramanujan	mathematical analysis, number theory, infinite series, and continued fractions
C. V. Raman	He was a physicist who won the Nobel Prize in 1930 for his Raman Effect.
Homi Jehangir Bhabha	The chief architect of the Indian atomic energy program.
Jagadish Chandra Bose	pioneered the investigation of radio and microwave optics.
Satyendra Nath Bose	Mathematician and physicist;
A.P.J. Abdul Kalam	development of India's missile and nuclear weapons programs.
Har Gobind Khorana	A biochemist who won the Nobel Prize
S.S. Abhyankar	contributions to algebraic geometry.
Meghnad Saha	Astrophysicist
Subrahmanyan Chandrasekhar	Astrophysicists won the Nobel Prize in 1983
Raj Reddy	A.M. Turing Award-winning computer scientist
Birbal Sahni	Paleobotanists are known for their research on the fossils of the Indian subcontinent.
Prasanta Chandra Mahalanobis	Statistician and physicist who founded the Indian Statistical Institute.

TALENT SEARCH STUDY MATERIAL – CLASS VII

INVENTORS/DISCOVERERS AND THEIR INVENTIONS/DISCOVERIES		
S,NO	Invention/Discovery	Name of the Inventor
1	Air Conditioner	Willis Carrier
2	Atom Bomb	Julius Robert Oppenheimer
3	Airplane	Wilber and Orville Wright
4	Aspirin	Dr. Felix Hoffman
5	Bifocal Lens	Benjamin Franklin
6	Barometer	Evangelista Torricelli
7	Celluloid	Alexander Parkes
8	Diesel Engine	Rudolf Diesel
9	Electroscope	William Gilbert
10	Electric Fan	Schuyler Wheeler
11	Electric Battery	Volta
12	Elevator	Elisha G. Otis
13	Electric Motor (DC)	Thomas Davenport
14	Helicopter	Igor Sikorsky
15	Laser	Theodore Maiman
16	Machine Gun	Richard Gatling
17	Theory of Relativity	Albert Einstein
18	Ozone	Christian Schonbein
19	Printing Press	Johannes Gutenberg
20	Periodic Table	Dmitri Mendeleev
21	Petrol for Motor Car	Karl Benz
22	Refrigerator	William Cullen
23	Rubber (vulcanized)	Charles Goodyear
24	Personal Computer	Steve Wozniak and Steve Jobs
25	Radio	Guglielmo Marconi
26	Steamboat	Robert Fulton
27	Internet	Vint Cerf and Bob Kahn
28	Stethoscope	Rene Laennec
29	Soft Contact lenses	Otto Wichterle
30	Xerox Machine	Chester Carlson

SUBJECT: SOCIAL SCIENCE

INCREDIBLE INDIA

Incredible India refers to India's unique beauty, diversity, and cultural richness. It highlights the country's amazing heritage, natural wonders, colorful festivals, and warm hospitality, making it a memorable destination for travelers from around the world. India is the world's seventh largest country by land area and second most populous, with over 1.4 billion people. India operates as a federal parliamentary democratic republic with 28 states and 8 Union Territories. The nation is renowned for its contributions to fields like science, technology, space exploration and medicine. It has a rapidly growing economy, driven by sectors such as IT, manufacturing, and services. India's cultural diversity is reflected in its numerous languages, religions, festivals, and traditions, making it a global symbol of unity in diversity.

Social Studies and Its Divisions

Social Studies is an educational subject that integrates concepts from various social sciences (like history, geography, civics and economics) to help students understand society, citizenship and the world around them.

HISTORY

The study of past events, people and societies, to understand how they have shaped the present and influence the future. Herodotus (484-425 BCE) is known as the 'Father of History' because he was the first to collect, document and present historical events in a systematic and narrative form in his work "The Historians"

GEOGRAPHY

The study of earth's physical features, climate and human activity, including how people interact with their environment. Eratosthenes (C. 276-194 BCE) is known as the 'Father of Geography' because he was the first to calculate the earth's circumference and develop a system of latitude and longitude. He also produced one of the earliest known maps of the world.

CIVICS

The study of the rights, duties and responsibilities of citizens and the formation of government, laws and society. Benjamin Franklin is universally recognized as the 'Father of Civics'.



TALENT SEARCH STUDY MATERIAL – CLASS VII

ECONOMICS

Economics is the study of how people, businesses, and government make choices about how to use limited resources to meet their needs and wants. It deals with production, consumption, and distribution of goods and services. The father of Economics is Adam Smith, a Scottish economist and philosopher.

Important Historical & Geographical Terms

- **Colonialism** - The control and settlement of a territory by a foreign power.
- **Nationalism** - A strong sense of pride and loyalty for one's nation.
- **Democracy** - A form of government where power lies with the people, typically through elected representatives.
- **Barter System** - An exchange of goods and services without using money.
- **Guild** - An Organisation of Merchants or Craftsperson who regulated trade, set prices and maintained quality.
- **Misl** - A Misl was a group or a confederacy of Sikh warriors or soldiers during the 18th century in Punjab.
- **Jagir** - A Jagir was a piece of land or estate granted by a king or emperor to a noble, military officer, or official in return for administrative service or military support.
- **Khalsa** - Khalsa refers to the community of initiated (baptized) Sikhs who follow a strict code of conduct and were first established by Guru Gobind Singh in 1699.
- **Rakhi** - Rakhi was a system of protection money or tax collected by Sikh Misls from local farmers, landlords, and traders in return for military protection from invaders or looters.
- **Ecosystem** - An ecosystem is a community of living organisms (like plants, animals, and microorganisms) interacting with each other and with non-living things (like air, water, and soil) in a particular environment.
- **Tsunami** - A tsunami is a large, powerful sea wave caused by underwater earthquakes, volcanic eruptions, or landslides under the ocean.
- **Convection** - Convection is the movement of heat within liquids and gases, where hot parts rise and cool parts sink, creating a continuous cycle.
- **Insolation** - Insolation refers to the amount of solar energy (sunlight) received by the Earth's surface.
- **Realms** - Realms refer to the large divisions or zones of the Earth that have distinct characteristics. In geography, the Earth is divided into four realms Lithosphere (land)Hydrosphere (water)Atmosphere (air)Biosphere (all living things)
- **Magma** - Magma is hot, molten (melted) rock found beneath the Earth's surface.
- **Patriarchy** - Patriarchy is a social system in which men hold more power and authority in family, society, and decision-making, while women have a subordinate role.
- **Hierarchy** - A hierarchy is a system in which people or things are ranked according to levels of importance, power, or status.
- **Portfolio** - A portfolio refers to the collection of responsibilities, duties, or work assigned to a person, especially a minister or official.
- **Caste** - Caste is a social group or class in which people are born, and it often determines their occupation, social status, and marriage choices.
- **Tawarikh** - Tawarikh is an Arabic and Persian term meaning "chronicles" or "historical records."
- **Garrison** - A garrison is a group of soldiers stationed at a specific location, like a fort, town, or base, to defend it.
- **Consumer** - A consumer is a person who buys or uses goods and services to satisfy their needs and wants.

TALENT SEARCH STUDY MATERIAL – CLASS VII

List of Indian States, Union Territories, and Their Key Features

Union Territories and their Capitals

1. Dadra & Nagar Haveli Daman & Diu - **Daman**
2. National Capital Territory of Delhi - **Delhi**
3. Jammu & Kashmir - **Srinagar(S) Jammu(W)**
4. Andaman & Nicobar - **Port Blair**
5. Puducherry - **Puducherry**
6. Chandigarh - **Chandigarh**
7. Lakshadweep - **Kavaratti**
8. Ladakh - **Leh**

STATES	ANDHRA PRADESH	ARUNACHAL PRADESH	ASSAM	BIHAR	CHATTIS GARH	GOA
CAPITAL	Amaravati	Itanagar	Dispur	Patna	Raipur	Panaji
FAMOUS FOR	Known as the "Rice Bowl of India".	Tawang Monastery, Indigenous Tribes, Scenic beauty.	Tea Gardens, Kaziranga National Park, Bihu Dance.	Bodh Gaya, Site of Nalanda University, Litti Chokha.	Tribal Culture, Chitrakote Waterfall.	Beaches, Tourism, Nightlife & Portuguese heritage
ANIMAL	Blackbuck	Gayal (Mithun)	Indian One-Horned Rhinoceros	Gaur (Indian Bison)	Wild Buffalo	Gaur (Indian Bison)
BIRD	Indian Roller (Palapitta)	Hornbill	White-winged Duck	House Sparrow	Hill Myna	Ruby-Throated Yellow Bulbul
FLOWER	Jasmine	Foxtail Orchid	Foxtail Orchid	Kachnar	Marigold	Jasmine
TREE	Neem	Hollong	Hollong	Peepal	Sal	Matti

STATES	GUJRAT	HARYANA	HIMACHAL PRADESH	JHARKHAND	KARNATAKA	KERALA
CAPITAL	Gandhinagar	Chandigarh (shared with Punjab)	Shimla	Ranchi	Bengaluru	Thiruvananthapuram
FAMOUS FOR	Gir Lions, Garba Dance, Rann of Kutch.	Agriculture, Haryanvi Folk Dance, Surajkund Mela	Hill Stations, Snow-Capped Mountains	Minerals, Waterfalls	IT Hub, Coffee, Mysore Palace, known as "Silicon Valley of India"	Backwaters, Ayurveda, Tourism
ANIMAL	Asiatic Lion	Blackbuck	Snow Leopard	Indian Elephant	Indian Elephant	Elephant
BIRD	Greater Flamingo	Black Francolin	Western Tragopan	Coel (Cuckoo)	Indian Roller	Great Hornbill
FLOWER	Marigold	Lotus	Pink Rhododendron	Palash (Flame of the Forest)	Lotus	Golden Shower
TREE	Banyan	Peepal	Deodar	Sal	Sandalwood	Coconut

TALENT SEARCH STUDY MATERIAL – CLASS VII

STATES	MADHYA PRADESH	MAHARASHTRA	MANIPUR	MEGHALAYA	MIZORAM	NAGALAND
CAPITAL	Bhopal	Mumbai	Imphal	Shillong	Aizawl	Kohima
FAMOUS FOR	Khajuraho Temples, Sanchi & National Parks, Known as "Heart of India"	Agriculture, Haryanvi Folk Dance, Surajkund Mela	Loktak Lake, Ras Leela Dance	Rainiest Place (Mawsynram) known as "the abode of clouds"	Bamboo, Tribal	Hornbill Festival
ANIMAL	Barasingha (Swamp Deer)	Giant Squirrel	Sangai (Brow-Antlered Deer)	Clouded Leopard	Serow	Mithun (Gayal)
BIRD	Asian Paradise Flycatcher	Yellow-Footed Green Pigeon	Nongin	Hill Myna	Hume's Pheasant	Blyth's Tragopan
FLOWER	Sacred Lotus	Jarul (Pride of India)	Shirui Lily	Lady's Slipper Orchid	Red Vanda	Rhododendron
TREE	Banyan	Mango	Uningthou	Gamhar	Ironwood	Alder

STATES	ODISHA	PUNJAB	RAJASTHAN	TAMIL NADU	TELANGANA	SIKKIM
CAPITAL	Bhubaneswar	Chandigarh	Jaipur	Chennai	Hyderabad	Gangtok
FAMOUS FOR	Jagannath Temple, Puri Beach	Golden Temple, Bhangra Dance, known as the "Granary of India"	Thar Desert, Forts, Palaces	Temples, Bharatanatyam	IT industry	Kangchenjunga, the highest peak in India, Buddha Park
ANIMAL	Sambar Deer	Blackbuck	Camel	Nilgiri Tahr	Jinka Deer	Red Panda
BIRD	Blue Jay (Indian Roller)	Northern Goshawk (Baaz)	Great Indian Bustard	Emerald Dove	Indian Roller	Blood Pheasant
FLOWER	Ashoka Flower	Gladiolus	Rohida	Gloriosa Lily	Tangedu	Noble Orchid
TREE	Banyan	Shisham	Khejri	Palm	Jammi tree	Rhododendron

STATES	WEST BENGAL	UTTAR PRADESH	UTTARAKHAND	TRIPURA
CAPITAL	Kolkata (Calcutta)	Lucknow	Dehradun	Agartala
FAMOUS FOR	Sunderbans (the largest Mangrove forest in the world), Howrah Bridge - largest cantilever bridge in India. (known as hanging bridge)	Most populous state, Agra (Tajmahal), Ayodhya, Varanasi	Pilgrim site - Kedarnath, Badrinath, Rishikesh	Rubber production (2 nd rank), Sundari temple
ANIMAL	Fishing Cat	Swamp Deer	Musk Deer	Phayre's Langur
BIRD	White - throated kingfisher	Sarus Crane	Himalayan monal	Green Imperial Pigeon
FLOWER	Night - flowering Jasmine	Palash	Brahma Kamal	Nageshwar
TREE	Chatim Tree	Ashoka tree	Buransh	Agar

DID YOU KNOW?

- 1.What city is known as the City of Canals? - **Venice**
- 2.Which country is known as the Land of the Rising Sun? - **Japan**
- 3.What is the driest place on Earth? - **Atacama Desert**
- 4.Which country is the largest producer of coffee in the world? - **Brazil**
- 5.In which country can you find the ancient city of Petra? - **Jordan**
- 6.Which country is home to the world's tallest building? - **United Arab Emirates**
- 7.Which country is known as the land of a thousand lakes? - **Finland**
- 8.What is the largest freshwater lake in the world by volume?- **Lake Baikal**
- 9.What is the tallest waterfall in the world? - **Angel Falls**
- 10.What is the name of the largest peninsula in the world? - **The Arabian peninsula**
- 11.Which city is known as the birthplace of democracy? - **Athens, Greece**
- 12.Which river crosses the Equator twice? - **The Congo River**
- 13.Which sea is the saltiest in the world? - **The Dead Sea**
- 14.What is the only continent without any bees? - **Antarctica**
- 15.What is the most densely populated city in the world? - **Manila, Philippines**

MEDIEVAL PERIOD OF INDIA

The medieval period of India (8th to 18th century) witnessed the rise and fall of several important empires and rulers.

1.Early Medieval Period (8th to 12th Century)

Main Empires/Emperors:

1. Rashtrakutas (Dantidurga, Amoghavarsha)
2. Cholas (Rajaraja Chola I, Rajendra Chola I)
3. Palas (Gopala, Dharmapala)
4. Pratiharas (Nagabhata I, Mihira Bhoja)

Important Events:

1. Battle of Rajasthan (738 CE): Defeat of Arab invaders by the Pratiharas, Palas, and Rashtrakutas.
2. Expansion of Chola Empire (985-1014 CE): Under Rajaraja Chola I, Cholas conquered Sri Lanka and the Maldives.
3. Establishment of the Pala Empire (750 CE): Gopala established the first major Buddhist empire in Bengal.

2.Delhi Sultanate (1206 to 1526)

1. Qutb-ud-din Aibak (Founder of Delhi Sultanate, Mamluk Dynasty)
2. Iltutmish (Consolidated the Sultanate, introduced Iqta system)
3. Razia Sultana (First and only female ruler of Delhi Sultanate)
4. Alauddin Khilji (Khilji Dynasty, expanded territory, introduced market reforms)
5. Capital shift by Muhammad bin Tughlaq (1327 CE): Attempted to shift the capital from Delhi to Daulatabad, which failed.

3.Vijayanagara and Bahmani Kingdoms (14th to 17th Century)

1. Harihara I and Bukka Raya I(Founders of the Vijayanagara Empire (1336CE)
2. Bahmani Sultans (Formed after the collapse of the Delhi Sultanate's control over Deccan)

TALENT SEARCH STUDY MATERIAL – CLASS VII

3. Reign of Krishnadevaraya (Greatest ruler of Vijayanagara Empire) (1509-1529 CE): Expansion of the Vijayanagara Empire and promotion of art, literature, and architecture.
4. Battle of Talikota (1565 CE): The combined Deccan Sultanates defeated Vijayanagara, leading to its decline.

4. Mughal Empire (1526 to 1857)

1. First Battle of Panipat (1526 CE): Babur defeated Ibrahim Lodi and established the Mughal Empire.
2. Second Battle of Panipat (1556) Akbar defeated Hemu
3. Jahangir (Known for his love of art and justice)
4. Shah Jahan (Built the Taj Mahal)
5. Reforms of Akbar (1556-1605 CE): Abolition of Jizya tax on non-Muslims, introduced Mansabdari system.
6. Construction of Taj Mahal (1632-1648 CE): Built by Shah Jahan as a mausoleum for his wife Mumtaz Mahal.
7. Rise of Marathas and Decline of Mughals (1707 CE onwards): After Aurangzeb's (Last powerful Mughal Ruler) death (1707), Marathas and other regional powers challenged Mughal authority.
8. Third Battle of Panipat (1761CE): Ahmad Shah Abdali defeated the Marathas.

The foreign travelers who visited India in various historical periods:

1.Ancient Era (Before 7th Century CE)

1. Megasthenes (302-298 BCE, Greek Ambassador)
 - Period: Mauryan Empire (Chandragupta Maurya's reign)
 - Work: Indica (now lost, but its fragments survive through other authors)
2. Fa-Hien (399-414 CE, Chinese Buddhist Monk)
 - Period: Gupta Empire (Chandragupta II's reign)
 - Work: Record of Buddhist Kingdom.
3. Claudius Ptolemy (2nd Century CE, Greek Geographer)
 - Period: Roman era
 - Work: Geography

2.Medieval Era (7th to 13th Century CE)

4. Hiuen Tsang (Xuanzang) (629-645 CE, Chinese Buddhist Monk)
 - Period: Harsha's reign (Pushyabhuti Dynasty)
 - Work: Great Tang Records on the Western Regions
5. Al-Masudi (10th Century CE, Arab Historian and Geographer)
 - Period: Post-Gupta period
 - Work: The Meadows of Gold and Mines of Gems
6. Al-Biruni (973-1048 CE, Persian Polymath)
 - Period: Mahmud of Ghazni's reign
 - Work: Kitab-ul-Hind (The Book of India)

7. Marco Polo (1254-1324 CE, Venetian Traveler)

- Period: Pandya and Kakatiya Kingdoms (South India)
- Work: The Travels of Marco Polo

3.Sultanate Era (13th to 16th Century CE)

8. Ibn Battuta (1333-1347 CE, Moroccan Traveler and Scholar)

- Period: Reign of Muhammad bin Tughlaq (Delhi Sultanate)
- Work: Rihla (The Travels)

9. Abdur Razzaq (1442-1444 CE, Persian Diplomat and Historian)

- Period: Vijayanagara Empire (Devaraya II's reign)
- Work: Matla-us-Saadain wa Majma-ul-Bahrain

4.Mughal Era (16th to 18th Century CE)

10. Duarte Barbosa (1500-1516 CE, Portuguese Traveler)

- Period: Early Mughal and Vijayanagara period
- Work: The Book of Duarte Barbosa

11. Fernao Nunes (16th Century CE, Portuguese Chronicler)

- Period: Vijayanagara Empire
- Work: Chronicles of Vijayanagara

12. Ralph Fitch (1583-1591 CE, English Merchant and Explorer)

- Period: Akbar's reign (Mughal Empire)
- Work: No major book, but his travel accounts were recorded

13. Jean-Baptiste Tavernier (1605-1689 CE, French Jeweler and Merchant)

- Period: Shah Jahan and Aurangzeb's reigns (Mughal Empire)
- Work: Six Voyages
- Purpose: Trade in precious stones and gems

14. Francois Bernier (1625-1688 CE, French Physician and Traveler)

- Period: Reign of Aurangzeb (Mughal Empire)
- Work: Travels in the Mughal Empire.

15. Niccolao Manucci (1638-1717 CE, Italian Traveler and Writer)

- Period: Mughal Empire (Aurangzeb's reign)
- Work: Storia do Mogor (History of Mughal)
- Colonial Era (18th to 20th Century CE)

16. James Tod (1782-1835 CE, British Officer and Historian)

- Period: British Colonial Rule
- Work: Annals and Antiquities of Rajasthan

17. William Hodges (1744-1797 CE, English Painter and Traveler)

- Period: British Colonial Rule
- Work: Travels in India

IMPORTANT ABBREVIATIONS

- ❖ **UN** – United Nations
- ❖ **UNESCO** – United Nations Educational, Scientific and Cultural Organization
- ❖ **UNICEF** – United Nations International Children's Emergency Fund
- ❖ **WHO** – World Health Organization
- ❖ **HR** – Human Rights
- ❖ **GDP** – Gross Domestic Product
- ❖ **GNP** – Gross National Product
- ❖ **HRD** – Human Resources Development
- ❖ **NATO** – North Atlantic Treaty Organization
- ❖ **SAARC** – South Asian Association for Regional Cooperation
- ❖ **NITI** – National Institution for Transforming India (NITI Aayog)
- ❖ **GST** – Goods and Services Tax
- ❖ **BC** – Before Christ
- ❖ **AD** – Anno Domini (In the year of the Lord)
- ❖ **BCE** – Before Common Era
- ❖ **CE** – Common Era
- ❖ **ASI** – Archaeological Survey of India

UNION CABINET MINISTERS 2024

- ❖ **Rajnath Singh** - Minister of Defence.
- ❖ **Amit Shah** - Minister of Home Affairs and Cooperation.
- ❖ **Nirmala Sitharaman** - Minister of Finance and Corporate Affairs.
- ❖ **S. Jaishankar** - Minister of External Affairs.
- ❖ **Nitin Gadkari** - Minister of Road Transport and Highways.
- ❖ **Jagat Prakash Nadda** - Minister of Health and Family Welfare
- ❖ **Shivraj Singh Chouhan** - Minister of Agriculture
- ❖ **Piyush Goyal** - Minister of Commerce and Industry.
- ❖ **Dharmendra Pradhan** - Minister of Education.
- ❖ **Ashwini Vaishnaw** - Minister of Railways
- ❖ **Gajendra Singh Shekhawat** - Minister of Culture and Tourism.
- ❖ **Annpurna Devi** - Minister of Women and Child Development.
- ❖ **Bhupender Yadav** - Minister of Environment, Forest and Climate Change.

SUBJECT: GENERAL KNOWLEDGE & CURRENT AFFAIRS

Nobel Prize Winners List 2024

Category	Nobel Prize Winners 2024 Name With Country	Awarded For
Nobel Prize Winners 2024 For Physiology or Medicine	Gary Ruvkun (USA) and Victor Ambros (USA)	"for their discoveries Medicine for their discovery of microRNAs, a class of small molecules essential for gene regulation"
The Nobel Prize 2024 In Physics	John Hopfield (USA) and Geoffrey Hinton (UK)	"for foundational discoveries and inventions that enable machine learning with artificial neural networks"
The Nobel Prize in Chemistry 2024	David Baker (USA) Denis Hassabis (UK) John M. Jumper (UK)	David Baker "for computational protein design" Demis Hassabis and John M. Jumper" for protein structure prediction"
Nobel Prize For Literature 2024	Han Kang (South Korea)	"for her intense poetic prose that confronts historical traumas and exposes the fragility of human life"
Nobel Peace Prize 2024 Winner	Nihon Hidankyo	"for his efforts to achieve a world free of nuclear weapons and for demonstrating through witness testimony that nuclear weapons must never be used again"
Nobel Prize in Economics 2024	Daron Acemoglu, Simon Johnson, James A. Robinson	"for studies of how institutions are formed and affect prosperity"

The Nobel Prize is one of the prestigious awards for persons who made discoveries for the person who conferred the greatest benefit to humankind in the fields of physics, chemistry, physiology or medicine, literature, and peace, collectively referred to as the **Nobel Prizes**.



Alfred Nobel (1833-1896) was born in Stockholm, Sweden, on October 21, 1833. He is known for inventing dynamite. Agency responsible for selection is specifically designated by Alfred Nobel.

Nobel prizes are awarded by the list of organizations provided below.

TALENT SEARCH STUDY MATERIAL – CLASS VII

Nobel Prize Category	Awarded By
Nobel Prize in Physics	Royal Swedish Academy of Sciences
Nobel Prize in Chemistry	Royal Swedish Academy of Sciences
Nobel Prize in Economic Sciences	The Royal Swedish Academy of Sciences
Nobel Prize in Peace	Norwegian Nobel Committee
Nobel Prize in Literature	Swedish Academy
Nobel Prize in Physiology and Medicine	Karolinska Institute

Nobel Prize facts

- Marie Curie is the only one woman who has been honoured twice, with the 1903 Nobel Prize in Physics and the 1911 Nobel Prize in Chemistry.
- John Bardeen is the only Nobel Laureate who has been awarded the Nobel Prize in Physics twice, in 1956 and 1972.
- Despite being nominated five times, Mohandas Karamchand Gandhi (Mahatma Gandhi) never won the Nobel Prize
- John B. Goodenough is the oldest recipient of this prize in Chemistry 2019 at the age of 97yrs.
- Malala Yousafzai is the youngest Nobel Laureate to get the Peace Prize in 2014 at the age of 17 yrs.
- The first Indian to receive the Nobel Prize was Rabindranath Tagore.

SPACE MISSION

Here is the list of ISRO's upcoming space missions.

Year	Mission Name	Mission Description
2024	Gaganyaan-1	The first test flight of the Gaganyaan spacecraft, designed to carry three astronauts.
2024	NISAR	A joint project with NASA to launch the first dual-band radar imaging satellite for remote sensing.
2025	Gaganyaan-2	The second test flight before the inaugural crewed mission.
2025	Venus Orbiter Mission (Shukrayaan)	An orbiter mission to study the atmosphere of Venus.

TALENT SEARCH STUDY MATERIAL – CLASS VII



mission

- ISRO chief Somnath wins 'IAF World Space Award 2024' for Chandrayaan-3. The award, presented in Milan, Italy, recognizes individuals who make significant contributions to space science and technology.
- Major lunar mission was approved by the Cabinet in 2024 - Chandrayaan-4

MOUNT EVEREST CLIMBING RECORDS

- Kami Rita Sherpa reached the Everest summit for the 30th time, successfully completing the 30th ascent.
- Dawa Finjok Sherpa- Fastest man **to climb Everest**
- Phunjo Lama- Fastest woman to climb Everest
- [Sir Edmund Hillary](#) (New Zealand)and [Tenzing Norgay](#)(Nepal) - First climbers confirmed as having reached the summit
- [Junko Tabei](#) - First woman to reach the summit



LIST OF NATURAL DISASTERS IN INDIA IN 2024

- Cyclone Remal, the first storm of the 2024 North Indian Ocean cyclone season, struck West Bengal and Bangladesh's Sunderban Delta.
- Cyclone Fengal, which made landfall near Puducherry.
- Devastating landslide in Kerala's Wayanad.
- The Vijaywada floods, caused by heavy rains and overflowing rivers.
- Between June and August, Himachal Pradesh witnessed 51 cloudburst and flash flood incidents.



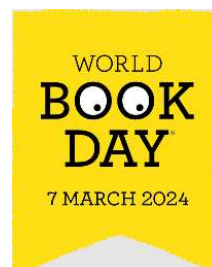
BOOKS AND AWARDS

- *Orbital: A Novel* by Samantha Harvey has been named the winner of the Booker Prize 2024.
- *Night Watch, a novel* by Jayne Anne Phillips, won the Pulitzer Prize 2024 for fiction.
- *2024 Booker International Prize Winner: Kairos* by Jenny Erpenbeck translated by Michael Hofmann
- Renowned Urdu poet Gulzar and Sanskrit scholar Jagadguru Rambhadracharya have been named the recipients of the 58th Jnanpith Award 2024.
- Booker Prize-winning author Arundhati Roy was honoured with the prestigious Pen Pinter Prize 2024 for her “unflinching and unswerving” writings



Most Read Books in 2024 For Children

- *Kareem Between* by Shifa Saltagi Safadi
- *The Dictionary Story* by Oliver Jeffers & Sam Winston
- *Insectarium* by Dave Goulson & Emily Carter (illustrator)
- *Olivetti* by Allie Millington
- *Circus Maximus: Return of the Champion* by Annelise Gray



TALENT SEARCH STUDY MATERIAL – CLASS VII

Greatest Books Ever Written for children

- Harry Potter series by J.K. Rowling
- The Chronicles of Narnia by C.S. Lewis
- Percy Jackson & the Olympians by Rick Riordan
- The Hobbit by J.R.R. Tolkien
- Charlotte's Web by E.B. White
- Anne of Green Gables by L.M. Montgomery
- The Secret Garden by Frances Hodgson Burnett
- Alice's Adventures in Wonderland by Lewis Carroll
- Matilda by Roald Dahl
- The Little Prince by Antoine de Saint-Exupéry



70th NATIONAL FILM AWARDS (2024)



The 70th National Film Awards ceremony was held at Vigyan Bhavan on October 8, where the film industry's top talents were honoured for their outstanding contributions in 2022. President Droupadi Murmu presented the prestigious awards, including the Dadasaheb Phalke Award to veteran actor Mithun Chakraborty.

Category	Winner	Film
Best Feature Film	Aattam	Aattam
Best Actor	Rishab Shetty	Kantara
Best Actress	Nithya Menen, Manasi Parekh	Tiruchitrabalam, Kutch Express
Best Director	Sooraj Barjatya	Uunchai
Best Supporting Actress	Neena Gupta	Uunchai
Best Supporting Actor	Pawan Malhotra	Fouja
Best Feature Film Providing Wholesome Entertainment	Kantara	Kantara
Best Non-Feature Film Promoting Social and Environmental Values	Kutch Express	Kutch Express

55th INTERNATIONAL FILM FESTIVAL OF INDIA, IFFI (2024)

Satyajit Ray Lifetime Achievement Award: Australian filmmaker Phillip Noyce

TALENT SEARCH STUDY MATERIAL – CLASS VII

Award	Winner	Film/Project
Golden Peacock (Best Film)	Saulė Bliuvaite	Toxic
Silver Peacock (Best Director)	Bogdan Muresanu	The New Year That Never Came
Silver Peacock (Best Actor – Male)	Clément Faveau	Holy Cow
Silver Peacock (Best Actor – Female)	Vesta Matulytė, Ieva Rupeikaitė	Toxic
Special Jury Award	Louise Courvoisier	Holy Cow
Best Debut Feature Film	Sarah Friedland	Familiar Touch
Best Debut Director of Indian Film	Navjyot Bandiwadekar	Gharat Ganpati
ICFT-UNESCO Gandhi Medal	Levan Akin	Crossing
Best Web Series (OTT)	Nipun Dharmadhikari	Lampan
Indian Film Personality of the Year	Vikrant Massey	12th Fail

SPORTS

India at the 2024 Summer Olympics

India competed at the 2024 Summer Olympics in Paris, France, held from 26 July to 11 August 2024. The Indian contingent consisted of 110 athletes who competed in 16 sports. P.V. Sindhu and Sharath Kamal were the flag-bearers for the opening ceremony. Manu Bhaker and P. R. Sreejesh carried the Indian flag during the closing ceremony. India won six medals including a silver and five bronze to be ranked 71st amongst the 206 NOCs.



Manu Bhaker	Bronze	Women's 10m air pistol shooting
Manu Bhaker-Sarabjot Singh	Bronze	Mixed team 10m air pistol shooting

TALENT SEARCH STUDY MATERIAL – CLASS VII

Swapnil Kusale	Bronze	Men's 50m rifle 3 positions shooting
Indian hockey team	Bronze	Men's hockey
Neeraj Chopra	Silver	Men's javelin throw
Aman Sehrawat	Bronze	Men's 57kg wrestling

India's Paralympic Story: A Tale of Inspiration and Achievement

India's para-athletes delivered their best-ever performance at the Paris Games, earning an incredible 29 medals—7 gold, 9 silver, and 13 bronze—securing an 18th-place finish in the overall medal tally. This achievement represents a watershed moment for Indian para-sports, showcasing the potential of Indian athletes on the global stage.

Gold medalist are - Avani Lekhara (Shooting (Women's 10m air rifle SH1)), Nitesh Kumar (Badminton (Men's singles SL3)), Sumit Antil (Athletics (Men's Javelin throw F64)), Harvinder Singh (Archery (Men's individual Recurve)), Dharambir (Athletics (Men's club throw F51)), Navdeep Singh Athletics ((Men's Javelin F41)), Praveen Kumar (Athletics (Men's high jump T64))

CRICKET

- India won the T20 World Cup in 2024, with Jasprit Bumrah named the man of the series
- The Kolkata Knight Riders (KKR) clinched the IPL 2024 title
- In the IPL 2024, the Orange Cap was won by Virat Kohli.
- Harshal Patel of Punjab Kings with 24 wickets was the winner of the Purple Cap in IPL 2024
- The country which won ICC Women's T20 World Cup 2024 is New Zealand
- BCCI President – Roger Binny
- Team India men's captain - Rohit Sharma
- Team India T20I Captain: Suryakumar Yadav
- Team India women's captain - Harmanpreet Kaur
- Team India Head Coach – Gautam Gambhir
- Jasprit Bumrah has broken Kapil Dev's record by becoming the fastest Asian bowler to take 50 wickets in Australia.



FOOTBALL

- FIFA- The Federation International de Football Association
- FIFA President – Giovanni Vincenzo Infantino
- FIFA Men's Player of the Year 2024 - Lionel Messi



- Men's Ballon d'Or 2024 Winner - Rodri
- Women's Ballon d'Or 2024 Winner - Aitana Bonmatí
- Isaah Yeo has become the first Australian player to win the IRL Golden Boot in seven years.
- The host for the FIFA World Cup 2034 has been confirmed as Saudi Arabia



TALENT SEARCH STUDY MATERIAL – CLASS VII

HOCKEY

- The Canadian women's national team claimed gold at the 2024 IIHF Women's World Championship in Utica, New York, with a thrilling overtime win over the United States, marking Canada's 13th title.
- The 2024 Men's FIH Hockey5s World Cup was the first edition of the Hockey5s World Cup, held in Muscat, Oman. The Netherlands emerged victorious, defeating Malaysia in the final to claim their first title
- In 2024, the Indian men's hockey team achieved significant success by winning the bronze medal at the Paris 2024 Olympics.



BADMINTON

- BWF World Ranking is the official ranking of the Badminton World Federation.
- It is used to determine the qualification for the World Championships and Summer Olympic Games, BWF World Tour tournaments.
- A seven-member Indian team, including two-time Olympic medallist **PV Sindhu**, competed at the **Paris 2024 Olympics badminton** tournament.
- [Lakshya Sen](#) created history by becoming the first male **Indian badminton player** to make the semi-finals at the Summer Games. However, he fell one win short of a medal.

Men's BWF Singles World Rankings

1. Shi Yuqi (PR China)
2. Anders Antonsen (Denmark)

Women's BWF Singles World Rankings

1. An Seyoung (Republic of Korea)
2. Wang Zhiyi (PR China)

KABBADI

Pakistan defeated the United States to lift the second New Zealand Kabaddi World Cup in Auckland

KHO-KHO

- The Kho Federation of India (KKFI) on Friday named the 24 nations that will participate in the inaugural Kho World Cup, scheduled to take place in January 2025, at New Delhi's IGI Stadium.

BILLIARDS

- The Prime Minister, Shri Narendra Modi today lauded Pankaj Advani on being crowned Billiards Champion at World Snooker Championships 2024 as a phenomenal accomplishment



TALENT SEARCH STUDY MATERIAL – CLASS VII

MOTOR RACING

- 2024 Formula One World Championship/Winner- Max Verstappen
- The 2024 United States Grand Prix was a Formula One motor race held, at the Circuit of the Americas in Austin, Texas, United States. Charles Leclerc won a U.S. Grand Prix
- Red Bull's [Max Verstappen](#) won the title of Spanish Grand Prix 2024
- Japanese Grand Prix - The 2024 Japanese Grand Prix (officially known as the Formula 1 MSC Cruises Japanese Grand Prix 2024) was a [Formula One](#) motor race held on 7 April 2024 at the [Suzuka International Racing Course](#) in [Suzuka, Japan](#).
- It was won by polesitter [Max Verstappen](#) driving for [Red Bull](#), with teammate [Sergio Pérez](#) and [Ferrari](#) driver [Carlos Sainz Jr.](#) behind him.
- World Constructors' Championship- McLaren – clinched the 2024 Constructors' Championship at the season finale in Abu Dhabi

- **CHESS**

- Viswanathan Anand won the 2024 Lyon Master Chess Championship for the 10th time



- India's D. Gukesh beat China's Ding Liren in the 14th round to claim the 2024 World Chess Championship at the Resorts World Sentosa in Singapore

LAWN TENNIS

Grand Slam Tournaments - In running order, the four grand slam events held each year are: Australian Open, French Open, Wimbledon, US Open. The French Open is played on clay, Wimbledon on grass and the remaining two are held on hard courts.

Men's Grand Slam Title 2024 Winners		
TOURNAMENT	WINNER	RUNNER-UP
U.S. Open	Jannik Sinner	Taylor Fritz
Wimbledon	Carlos Alcaraz	Novak Djokovic
French Open	Carlos Alcaraz	Alexander Zverev
Australian Open	Jannik Sinner	Daniil Medvedev

TALENT SEARCH STUDY MATERIAL – CLASS VII

Women's Grand Slam Title 2024 Winners		
TOURNAMENT	WINNER	RUNNER-UP
U.S. Open	Aryna Sabalenka	Jessica Pegula
Wimbledon	Barbora Krejckikova	Jasmine Paolini
French Open	Iga Swiatek	Jasmine Paolini
Australian Open	Aryna Sabalenka	Zheng Qinwen

DAVIS CUP Italy were crowned tennis champions of the world in Málaga, Spain

THE 2024 CHAMPIONS OF THE EARTH - the United Nations' highest environmental honor, were awarded to six extraordinary individuals and organizations for their outstanding leadership

Meet the 2024 Champions of the Earth

1. **Sonia Guajajara (Brazil) – Policy Leadership**
2. **Amy Bowers Cordalis (United States) – Inspiration and Action**
3. **Gabriel Paun (Romania) – Inspiration and Action**
4. **Lu Qi (China) – Science and Innovation**
5. **Madhav Gadgil (India) – Lifetime Achievement**
6. **SEKEM Initiative (Egypt) – Entrepreneurial Vision**

International Current affairs

- The country which hosted the 16th BRICS Summit in 2024 is Russia.
- The country which will host the ASEAN Summit in 2025 is Malaysia.
- India will host the Quad Leaders' Summit in 2025.
- The country that has recently launched the world' first 6G communication satellite is China
- The 18th Pravasi Bharatiya Divas 2025 will be held at Bhubaneshwar, Odisha
- Claudia Sheinbaum was sworn in as Mexico's first female President in 2024.
- The Bihar government has approved the development of Kaimur Wildlife Sanctuary as a tiger reserve
- Miss Universe 2024 - was the 73rd Miss Universe pageant, held at the Arena CDMX in Mexico City, Mexico. Sheynnis Palacios of Nicaragua crowned Victoria Kjær Theilvig of Denmark as her successor at the end of the event.
- The 2024 G20 Rio de Janeiro summit was the nineteenth meeting of Group of Twenty (G20), a Heads of State and Government meeting held at the Museum of Modern Art in Rio de Janeiro from 18–19 November 2024. It was the first G20 summit to be hosted in Brazil

TALENT SEARCH STUDY MATERIAL – CLASS VII

- The Ramon Magsaysay Award the Ramon Magsaysay Award winners for 2024: Hayao Miyazaki, Phuntsho Karma, Nguyen Thi Ngoc Phuong, Farhan Farwiza, Rural Doctors Movement
- The Indira Gandhi Prize for Peace, Disarmament and Development for 2024 has been conferred on former Chilean president and prominent human rights voice Michelle Bachelet

Saudi Arabia Current affairs & facts

- IOC Announces Olympic Esports Games to Be Hosted in The Kingdom of Saudi Arabia
- The International Olympic Committee, announced that it has partnered with the National Olympic Committee of Saudi Arabia to host the inaugural Olympic Esports Games 2025 in the Kingdom of Saudi Arabia
- India Welcomes Egypt, Iran, UAE, Saudi Arabia and Ethiopia Joining BRICS



- Saudi Arabia Names Faisal bin Saud Al-Mejfel as Ambassador to Syria
- Indian Engineering Exports Surge: UAE, Russia, and Saudi Arabia Lead the Way
- UN Appoints Saudi Arabia to Lead Women's Rights Forum Despite Criticism
- Rumi Alqahtani, a 27-year-old model and influencer from Saudi Arabia, announced on Instagram that she will be the first participant from the country in the Miss Universe competition.
- Max Verstappen Triumphs at Saudi Arabian Grand Prix
- Saudi Arabia's First Luxury Train 'Dream of the Desert' is Launched First in The Middle East
- India, Saudi Arabia Explore New Avenues of Defence Cooperation
- Qiddiya City is an entertainment development project, spanning more than 334 square kilometers on the outskirts of Riyadh.
- Saudi Arabia officially announced as the 2034 FIFA World Cup host.
- The 2029 Asian Winter Games, to be held in Trojena, Saudi Arabia
- Cristiano Ronaldo, 38, joined Al-Nassr in early 2023 and signed a contract that runs until June 30, 2025. During his time in Saudi Arabia, he has continued to demonstrate his goal-scoring ability and has become an emblem of the Saudi league, attracting global attention.
- Riyadh Season 2024 will kick off in October, 2024, and will run until May 2025, making it one of the longest entertainment events in the world.



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