SUMMER HOLIDAY HOMEOWRK – HUMANITIES
Class XI Session (2025-26)

English

Instructions: Attempt all questions to the best of your ability. Pay attention to grammar, spelling, and presentation. This assignment is designed to help you revise key concepts and express your creativity. **Have a wonderful and productive holiday!**

Total Marks: 25

Section A: Grammar (10 Marks)

1. Fill in the blanks with the most appropriate determiners: (2 Marks)

a) Have you got _____ new books to read? (some / any / many) b) He is _____ honest man. (a / an / the) c) She spent _____ money she had saved. (little / few / all) d) _____ of the students were present in the class. (Each / Every / Both)

2. Complete the following sentences using the correct tense of the verbs given in brackets: (2 Marks)

a) My train _____ (arrive) at 6 pm yesterday. b) They _____ (play) football in the park right now. c) By the time we reach the station, the bus _____ (leave). d) She _____ (live) in this city for ten years.

3. Fill in the blanks with the most suitable modals: (2 Marks)

a) You _____ (should / must / might) see a doctor if you have a fever. b) I _____ (can / could / may) swim across the river when I was younger. c) It _____ (will / would / shall) probably rain this evening. d) Students _____ (need / dare / ought to) submit their assignments on time.

4. Rewrite the following sentences correcting the subject-verb concord: (2 Marks)

a) The quality of the apples were not good. b) Each boy and girl have received a prize. c) Neither the cat nor the dogs was happy. d) Physics are a difficult subject for many students.

5. Change the following sentences into Reported Speech: (2 Marks)

a) He said to me, "What are you doing?" b) The teacher said, "Close the door, please."

Section B: Writing Skills (15 Marks)

6. Letter Writing (8 Marks)

Write a letter to the Editor of a local newspaper expressing your concern about the increasing noise pollution in your city and suggesting possible measures to control it.

7. Poster Making (7 Marks)

Design a creative and informative poster on one of the following topics:

a) **Save Water, Save Life**
b) **Say No to Single-Use Plastic**
c) **Importance of Reading Books**

Your poster should include:

- A catchy title/slogan
- Relevant images or drawings
- A clear message
- Use of different fonts and colors to make it visually appealing.

GEOGRAPHY

Show your cartography skill by doing the following :

- On Indian physical and political map: **(Paste in Notebook)**
    1. Rivers of India
    2. Soils in India
    3. Major crops wheat & rice growing areas
    4. Major Airports in India
    5. Major Seaport in India
    6. Dams
    7. State and capitals
    8. Demographic
- On world map:- **(Paste in Notebook)**
    1. Major Mountain ranges
    2. Hot & Cold Desert
    3. Grasslands of world
    4. Major Airports
    5. Major Seaports
    6. Largest country in each continent
- Read the Chapter No- 1 Introduction to map (Book 3) and note the essentials in your notebook

POLITICAL SCIENCE

SECTION – A

Q1. What is a constitution?
(a) A document that specifies the basic allocation of power in a society
(b) A document that lists the laws governing a society
(c) A document that specifies foreign policies of the country
(d) A document that specifies the economic policies in a society

Q2. In the Indian Constitution, who has the authority to enact laws and policies?
(a) The Prime Minister (b) The President (c) The Judiciary (d) Parliament

Q3. Why is it important to identify who has the power to make decisions in a society?
(a) To prevent abuse of power (b) To ensure a fair and just society
(c) To uphold democratic principles (d) All of these

Q4. What are some basic liberties that citizens are normally entitled to?
(a) Freedom of speech, freedom of conscience, freedom of association, freedom to conduct a trade or business
(b) Right to bear arms, right to a fair trial, right to privacy, right to education
(c) Right to vote, right to own property, right to healthcare, right to free transportation
(d) None of the above

Q5. What was particularly innovative about the Indian Constitution?
(a) It limited the power of the government more than any other constitution
(b) It provided an enabling framework for the government to take positive measures to overcome forms of inequality or deprivation
(c) It had no limits on government power
(d) None of the above

Q6. What is a bill of rights?
(a) A list of responsibilities citizens must uphold
(b) A document that outlines the powers of the government

(c) A list of rights protected by the constitution
(d) A contract between the government and its citizens

Q7. How does the Indian Constitution ensure that fundamental rights are not violated by the government?

(a) By listing them in the Constitution
(b) By making special provisions for their protection
(c) By providing extra rights to the government
(d) By ignoring violations of fundamental rights

Q8. How are Fundamental Rights different from other legal rights?

(a) Fundamental Rights are protected and guaranteed by the constitution, while other rights are protected by ordinary law
(b) Fundamental Rights can be changed by ordinary law, while other rights can only be changed by amending the Constitution
(c) Fundamental Rights are enforced by the legislature, while other rights are enforced by the judiciary
(d) Fundamental Rights are absolute and unlimited, while other rights are subject to government restrictions.

Q9. The Directive Principles were incorporated in the Indian Constitution, with a view to:

(a) Ensure a democratic government in the country (b) Provide a strong central government
(c) Establish a welfare state (d) Raise the living standard of the backward class

Q10. Assertion [A]: Our constitution makers divided our government into three branches- legislature, executive, and judiciary.
Reason [R]: The three divisions of the government are designed to hold checks and balances over one another.

(a) Both (A) and (R) are true, but (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true

SECTION – B

Q11. Study the passage given below carefully and answer the questions that follow.

The independence of India should mean the independence of the whole of India… Independence must begin at the bottom. Thus, every village will be a republic… It follows therefore that every village has to be self-sustained and capable of managing its affairs. In this structure composed of innumerable villages, there will be ever-widening, ever-ascending circles. Life will be a pyramid with the apex sustained by the bottom – Mahatma Gandhi.

11.1 Which concept is Gandhiji explaining in the above passage?
11.2 What are the Gandhiji's views regarding the decentralization of powers?
11.3 "Do you take decentralization as a means to minimize the conflicts"? Give your opinion.

Q12. Understand cartoon and write answers of following questions.

12.1 Can you identify what these different groups stand for?
12.2 Who do you think prevailed in this balancing act?

SECTION – C(Write answers in fair notebook)

Q18. Give two examples each to support the following conclusions about the Indian Constitution:
(a) The Constitution was made by credible leaders who commanded people's respect.

(b) The Constitution has distributed power in such a way as to make it difficult to subvert it.
(c) The Constitution is the locus of people's hopes and aspirations.

Q19.Which of the Fundamental Rights is in your opinion the most important right? Summarise its provisions and give arguments to show why it is most important.

Q20 Throw some light on the relationship between the Fundamental Rights and Directive Principles of State Policy and Fundamental Duties.

History

Section-A

A. Multiple Choice Questions:

1. Which river determined the boundary of the Roman Empire in the North?
   A. Rhine B. Danube C. Tigris and Euphrates D. A and B both
2. What was used abundantly for writing in Roman Empire?
   A. Paper B. Papyrus C. Metal Tablets D. Clay Tablets
3. Who founded 'The Principate '?
   A. Augustus B. Julius Caesar C. Trajan D. Tiberius
4. Whose reign is remembered as the "age of peace"?
   A. Augustus B. Tiberius C. Constantine D. Justinian
5. What were the main business items in the economy of The Roman Empire?
   A. Wheat B. Wine C. Olive Oil D. All of the above

Section-B

B. Short Answer Questions:

1. 'Roman Empire was a diverse Empire at cultural level'. Justify the statement.
2. Emperor Diocletian made what changes in the Roman Empire?
3. Review the status of 'Republic' in The Roman Empire.

Section-C

C. Source Based Question:
On the Treatment of Slaves

'Soon afterwards the City Prefect, Lucius Pedanius Secundus, was murdered by one of his slaves. After the murder, ancient custom required that every slave residing under the same roof must be executed. But a crowd gathered, eager to save so many innocent lives; and rioting began. The senate-house was besieged. Inside, there was feeling against excessive severity, but the majority opposed any change (….) [The senators] favouring execution prevailed. However, great crowds ready with stones and torches prevented the order from being carried out. Nero rebuked the population by edict, and lined with troops the whole route along which those condemned were taken for execution.'

a) Mention the ways by which the slaves were controlled and disciplined.
b. How did the common people try to prevent the execution of the slaves?
c. According to the passage, was the execution carried out?

Section-D

D. Long Answer Questions:

1. What were the main characteristic features of the Roman Society?
2. What were the main contributions of Roman Empire to the world?
3. 'Roman army was a key institution of the Roman Empire'. Justify the statement.

Section-E

E. Mark the following on the Map:

a. Rome b. Constantinople c. Alexandria d. Campania e. River Rhine

SOCIOLOGY

1. **Prepare a research study for sociology . Guidelines for which are shared as under:**

a. Carry out a research study on any social issue that we are facing in our society or any other social problem in a detailed manner using 20 interviews, questionnaire, direct or indirect observation.
b. The research design should contain all the necessary sub-topics including analysis.

Topics to be included while writing the content in the research study:

- Statement of Purpose (what made one pick up a certain topic)
- Research Question or Hypothesis (only one)
- Methodology (definition of the method chosen, why the method is appropriate for the topic chosen, advantages and disadvantages of the method)
- Presentation of secondary evidence such a newspaper articles, magazines articles and so on.

Following is the list of suggested topics:

Choose any one from the below or select your own topic related to social life.

- Disintegration of joint family
- Cyber bullying
- Gender inequality
- Role of women in society
- Social change
- Child Labour

Steps to be followed:

- Select a topic from the above list or identify your own topic related with social life.
- Get your topic approved by the subject teacher.
- Start the research work.
- Research should include primary and secondary sources.
- Formulate the hypothesis.
- Prepare a rough draft of the matter to be written in final file.
- Prepare for verification of your hypothesis with the help of method chosen for research (interview, questionnaire, survey, observation etc. whichever suits your hypothesis.)
- Perform the verification task.
- Note the conclusion.

Note : the entire work has to be done in A-4 Sheets.

HOLIDAY HOMEWORK
CLASS XI- MATHS

Trigonometric Functions

1. If $\sin\theta=\frac{3}{5},\tan\varphi=\frac{1}{2},\frac{\pi}{2}<\theta<\pi<\varphi<\frac{3\pi}{2}$ then find the value of $8\tan\theta-\sqrt{5}\sec\varphi$.
   $\left(A=\frac{-7}{2}\right)$
2. If $\sin A=\frac{3}{5},0<A<\frac{\pi}{2},\cos B=\frac{-12}{13},\pi<B<\frac{3\pi}{2}$, find the value of
   $\sin(A-B),\cos(A+B),\tan(A-B)$
3. If A lies in the fourth quadrant and $\cos A=\frac{5}{13}$, find the value of $\frac{13\sin A+5\sec A}{5\tan A+6\cos ecA}$
4. If $\cos\theta=\frac{-1}{2}$ and $\pi<\theta<\frac{3\pi}{2}$, find the value of $4\tan^2\theta-3\cos^2\theta$
5. If $\sin A=\frac{3}{5},0<A<\frac{\pi}{2}$ and $\cos B=\frac{-12}{13},\pi<B<\frac{3\pi}{2}$ then find the following:
   (i) $\sin(A-B)$ (ii) $\cos(A+B)$ (iii) $\tan(A-B)\left(A=\frac{-16}{65},\frac{-33}{65},\frac{16}{63}\right)$
6. Find the value of $\tan(A+B)$, given that $\cot A=\frac{1}{2},\sec B=\frac{-5}{3},\pi<A<\frac{3\pi}{2},\frac{\pi}{2}<B<\pi$
7. Prove the following:
   a) $\cos570^\circ\sin510^\circ+\sin(-330^\circ)\cos(-390^\circ)=0$
   b) $\frac{\cos(2\pi+\theta)\cos ec(2\pi+\theta)\tan\left(\frac{\pi}{2}+\theta\right)}{\sec\left(\frac{\pi}{2}+\theta\right)\cos(\theta)\cot(\pi+\theta)}=1$
   c) $\frac{\cos(90^\circ+\theta)\sec(-\theta)\tan(180^\circ-\theta)}{\sec(360^\circ-\theta)\sin(180^\circ+\theta)\cot(90^\circ-\theta)}=-1$
   d) $\sin^2\frac{\pi}{4}+\sin^2\frac{3\pi}{4}+\sin^2\frac{5\pi}{4}+\sin^2\frac{7\pi}{4}=2$
   e) $\sin600^\circ\tan(-690^\circ)+\sec840^\circ\cot(-945^\circ)=\frac{3}{2}$
   f) $\cos306^\circ+\cos234^\circ+\cos162^\circ+\cos18^\circ=0$
   g) $\sin^254^\circ-\sin^272^\circ=\sin^218^\circ-\sin^236^\circ$
8. In any quadrilateral ABCD, prove that: $\sin(A+B)+\sin(C+D)=0$
9. Prove that:
   a) $\tan315^\circ\cot(-405^\circ)+\cot495^\circ\tan(-585^\circ)=2$
   b) $\cos510^\circ\cos330^\circ+\sin390^\circ\cos120^\circ=-1$
   c) $\sin\frac{8\pi}{3}\cos\frac{23\pi}{6}+\cos\frac{13\pi}{3}\sin\frac{35\pi}{6}=\frac{1}{2}$
   d) $\cos570^\circ\sin510^\circ+\sin(-330^\circ)\cos(-390^\circ)=0$

e) $3\sin\frac{\pi}{6}\sec\frac{\pi}{3}-4\sin\frac{5\pi}{6}\cot\frac{\pi}{4}=1$

f) $\dfrac{\cos(2\pi+\theta)\cos ec(4\pi+\theta)\tan\left(\frac{\pi}{2}+\theta\right)}{\sec\left(\frac{\pi}{2}+\theta\right)\cos(-\theta)\cot(\pi+\theta)}=1$

10. In any cyclic quadrilateral ABCD, prove:
    a) $\tan A+\tan B+\tan C+\tan D=0$
    b) $\cos(180°-A)+\cos(180°+B)+\cos(180°+C)-\sin(90°+D)=0$
11. Find x from the following equation: $\cos ec(90°+\theta)+x\cos\theta\cot(90°+\theta)=\sin(90°+\theta)$
12. If A,B,C,D are angles of a cyclic quadrilateral, prove that:
    $\cos A+\cos B+\cos C+\cos D=0$
13. Find x from the following equation:
    a) $\cos ec(270°+A)=\cos(180°+A)+x\sin(90°+A)\cot(270°+A)$
    b) $x\cot(90°+A)+\tan(90°+A)\sin A+\cos ec(90°+A)=0$
14. Prove that:
    a) $\tan 8\theta-\tan 6\theta-\tan 2\theta=\tan 8\theta\tan 6\theta\tan 2\theta$
    b) $\tan 70°=\tan 20°+2\tan 50°$
    c) $\dfrac{\cos 11°+\sin 11°}{\cos 11°-\sin 11°}=\tan 56°$
    d) $\dfrac{\cos 15°-\sin 15°}{\cos 15°+\sin 15°}=\dfrac{1}{\sqrt{3}}$
15. If $A+B=\frac{\pi}{4}$, prove that $(1+\tan A)(1+\tan B)=2$
16. Evaluate : a) $\cos(-1125°)$ b) $\tan\left(\frac{11\pi}{6}\right)$ c) $\cos ec(-1200°)$
17. Prove that :
    a) $\dfrac{\sin(A+B)+\sin(A-B)}{\cos(A+B)+\cos(A-B)}=\tan A$
    b) $\dfrac{\sin(A-B)}{\cos A\cos B}+\dfrac{\sin(B-C)}{\cos B\cos C}+\dfrac{\sin(C-A)}{\cos C\cos A}=0$
    c) $\tan 13\theta-\tan 9\theta-\tan 4\theta=\tan 13\theta\tan 9\theta\tan 4\theta$
    d) $\tan 15°+\tan 30°+\tan 15°\tan 30°=1$
    e) $\tan 36°+\tan 9°+\tan 36°\tan 9°=1$
    f) $\dfrac{\cos 8°-\sin 8°}{\cos 8°+\sin 8°}=\tan 37°$
    g) $\dfrac{\cos 9°+\sin 9°}{\cos 9°-\sin 9°}=\tan 54°$
    h) $\tan 50°=\tan 40°+2\tan 10°$
    i) $\tan\left(\frac{\pi}{4}+A\right)\tan\left(\frac{\pi}{4}-A\right)=1$

j) $(1+\tan A)(1+\tan B)=2\tan A$, *where* A - B $=\frac{\pi}{4}$

k) $\tan 75°-\tan 30°-\tan 75°\tan 30°=1$

18. If $\tan x+\tan\left(x+\frac{\pi}{3}\right)+\tan\left(x+\frac{2\pi}{3}\right)=3$, the prove that : $\frac{3\tan x-\tan^3 x}{1-3\tan^2 x}=1$

19. Prove that:

a) $\frac{1+\sin 2\theta+\cos 2\theta}{1+\sin 2\theta-\cos 2\theta}=\cot\theta$

b) $\frac{\cos 2\theta}{1+\sin 2\theta}=\tan\left(\frac{\pi}{4}-\theta\right)$

c) $\frac{\cot\theta+\cos ec\theta-1}{\cot\theta-\cos ec\theta+1}=\cot\frac{\theta}{2}$

d) If $\tan\frac{x}{2}=\frac{n}{m}$, find the value of $m\cos x+n\sin x$

20. Show that: $\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}=2\cos\theta$

21. Prove that :

a) $\frac{\sin 2\theta}{1-\cos 2\theta}=\cot\theta$

b) $\frac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}=\tan\frac{\theta}{2}$

c) $\sqrt{\frac{1-\cos 2\theta}{1+\cos 2\theta}}=\tan\theta$

d) $\sqrt{2+\sqrt{2+2\cos 4\theta}}=2\cos\theta$

e) $\frac{\sin 2\theta+\sin\theta}{1+\cos\theta+\cos 2\theta}=\tan\theta$

f) $\cos 4\theta=1-8\sin^2\theta+8\sin^4\theta$

22. If $\sin x=\frac{\sqrt{5}}{3}$ and $\frac{\pi}{2}<x<\pi$, find the value of $\sin\frac{x}{2},\cos\frac{x}{2},\tan\frac{x}{2}$.

23. Prove that : $\cos^4\frac{\pi}{8}+\cos^4\frac{3\pi}{8}+\cos^4\frac{5\pi}{8}+\cos^4\frac{7\pi}{8}=\frac{3}{2}$

24. Prove that: $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right)=\frac{1}{8}$

25. Prove that : $\sin^4\frac{\pi}{8}+\sin^4\frac{3\pi}{8}+\sin^4\frac{5\pi}{8}+\sin^4\frac{7\pi}{8}=\frac{3}{2}$

26. Prove that: $\cos 5A=16\cos^5 A-20\cos^3 A+5\cos A$

27. Prove that :

a) $\frac{\sin 5x+\sin 3x}{\cos 5x+\cos 3x}=\tan 4x$

b) $\dfrac{\sin x-\sin y}{\cos x+\cos y}=\tan\left(\dfrac{x-y}{2}\right)$

c) $\dfrac{\cos x-\cos 2x+\cos 3x}{\sin x-\sin 2x+\sin 3x}=\cot 2x$

d) $\dfrac{(\cos x-\cos 3x)(\sin 8x+\sin 2x)}{(\sin 5x-\sin x)(\cos 4x-\cos 6x)}=1$

e) $\dfrac{\sin A+2\sin 3A+\sin 5A}{\sin 3A+2\sin 5A+\sin 7A}=\dfrac{\sin 3A}{\sin 5A}$

f) $\dfrac{\sin 3A+\sin 5A+\sin 7A+\sin 9A}{\cos 3A+\cos 5A+\cos 7A+\cos 9A}=\tan 6A$

g) $\dfrac{\sin(x+y)-2\sin x+\sin(x-y)}{\cos(x+y)-2\cos x+\cos(x-y)}=\tan x$

h) $\cos 40^\circ+\cos 50^\circ+\cos 70^\circ+\cos 80^\circ=\cos 10^\circ+\cos 20^\circ$

i) $\cos\theta-\cos 3\theta+\cos 5\theta-\cos 7\theta=4\sin\theta\sin 4\theta\cos 2\theta$

j) $\sin\theta+\sin\left(\dfrac{2\pi}{3}+\theta\right)+\sin\left(\dfrac{4\pi}{3}+\theta\right)=0$

k) *If* $\dfrac{\sin x}{a}=\dfrac{\cos x}{b}$, prove that $a\sin 2x+b\cos 2x=b$

28. Prove that: $\dfrac{\cos 8A\cos 5A-\cos 12A\cos 9A}{\sin 8A\cos 5A+\cos 12A\sin 9A}=\tan 4A$

29. Prove that: $\sin 10^\circ\sin 30^\circ\sin 50^\circ\sin 70^\circ=\dfrac{1}{16}$

30. Prove that: $\cos 10^\circ\cos 30^\circ\cos 50^\circ\cos 70^\circ=\dfrac{3}{16}$

31. Prove the following :

a) $\dfrac{\sin 3A\cos 2A-\sin 6A\cos A}{\sin A\sin 2A-\cos 2A\cos 3A}=\dfrac{\sin 3A}{\cos A}$

b) $\dfrac{\sin 3A\cos 4A-\sin A\cos 2A}{\sin 4A\sin A+\cos 6A\cos A}=\tan 2A$

c) $\dfrac{\sin 2A\sin 3A-\sin A\sin 4A+\sin 5A\sin 2A}{\cos 4A\cos 5A-\cos 3A\cos 6A+\cos 5A\cos 2A}=\tan 4A\tan 3A$

d) $\cos 20^\circ\cos 40^\circ\cos 60^\circ\cos 80^\circ=\dfrac{1}{16}$

e) $\sin 10^\circ\sin 50^\circ\sin 60^\circ\sin 70^\circ=\dfrac{\sqrt{3}}{16}$

f) $\tan 20^\circ\tan 30^\circ\tan 40^\circ\tan 80^\circ=1$

(iii) $\cot\theta + \operatorname{cosec}\theta = \sqrt{3}$

(iv) $\sin 2x = \cos 3x$

(v) $4\cos x - 3\sec x = \tan x$

(vi) $\tan x + \tan 2x + \tan x \tan 2x = 1$

(vii) $\cos x + \cos 3x - 2\cos 2x = 0$

33. Find the general solutions of the following equations :

a) $\cos 3\theta = -\frac{1}{2}$

b) $\tan\left(\frac{2}{3}\theta\right) = \sqrt{3}$

c) $\tan^2\theta + \left(1-\sqrt{3}\right)\tan\theta - \sqrt{3} = 0$

d) $\tan x + \tan 2x + \tan 3x = \tan x \tan 2x \tan 3x$

e) $2\sin^2 x + \sqrt{3}\cos x + 1 = 0$

f) $\sin x + \sin 2x + \sin 3x = 0$

g) $\cos x + \cos 3x - \cos 2x = 0$

h) $\sqrt{3}\cos x + \sin x = 1$

i) $\operatorname{cosec} x = 1 + \cot x$

Ch: COMPLEX NUMBERS

1. If a, b, c are real numbers such that $a \le b, c > 0$, then:

   (i) $ac \le bc$ (ii) ac <bc (iii)ac >bc (iv) $ac \ge bc$. (Choose the correct option)

2. Solve for x: $3x + 9 \ge -x + 19$
3. Solve: $3x - 4 < 7$,when $x \in Z$
4. Solve the following system of inequalities: $2x - 3 < 7, 2x > -4$
5. How many litres of a 30% acid solution must be added to 500 litres of a 12% solution so that acid content in the resulting mixture will be more than 14% but less than 20%.
6. Solve: $6x + 2 < 4x + 7$, when (i) x is a natural number (ii) x is an integer (iii) x is a real number and represent solution for each part on the number line.
7. Find all pairs of consecutive even positive integers, both of which are larger than 7, such that their sum is less than 30.
8. The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 7.2 and 7.8. If the first two pH readings are 7.48 and 7.85, find the range of pH value for the third reading that will result in the acidity level being normal.
9. Solve the following linear inequalities and show the graph of solution in each case on the number line :($x \in R$)

   (i) $\frac{2x+3}{4} - 3 < \frac{x-4}{3} - 2$ (ii) $|3x - 7| > 4$ (iii) $\frac{5x+8}{4-x} < 2$

   (iv) $\left|\frac{3x-4}{2}\right| \le \frac{5}{12}$ (v) $3x - 2 > x + \frac{4-x}{3} > 3$

10. Solve the following system of inequalities:

    (i) $5x - 7 < 3(x + 3)$, $1 - \frac{3x}{2} \ge x - 4$

    (ii) $\frac{5x}{4} + \frac{3x}{8} > \frac{39}{8}$, $\frac{2x-1}{12} - \frac{x-11}{3} < \frac{3x+1}{4}$

11. Solve the following system of inequalities graphically:

    (i) $3x + 4y \ge 12,\ 4x + 7y \le 28,\ y \ge 1,\ x \ge 0,\ y \ge 0$

    (ii) $x + 2y \le 10,\ x + y \ge 1,\ x - y \le 0,\ x \ge 0,\ y \ge 0$

    (iii) $x + 2y \le 40, 3x + y \ge 30, 4x + 3y > 60, x \ge 0, y \ge 0$

Ch: Linear Inequations

1. Find the value of x and y $(x, y \in R)$ if : $2y + (3x - y)i = 5 - 2i$
2. Express $3i^3 + 6i^{16} - 7i^{29} + 4i^{27}$ in the form $x + iy$ where $x, y \in R$.
3. Evaluate : $\left(i^{41} + \frac{1}{i^{257}}\right)^9$
4. If $Z_1 = 1 - i, Z_2 = -2 + 4i,$ find $\text{Im}\left(\frac{Z_1 Z_2}{\overline{Z_1}}\right)$.
5. Find the conjugate of the complex number: $\frac{1}{2 - 3i}$
6. Write the following complex numbers in the polar form:
   (i) $-2 - 2i$ (ii) $\frac{1}{1+i}$
7. Find the complex conjugate of $\frac{(8 - 3i)(6 - i)}{2 - 2i}$.
8. Find the multiplicative inverse of $\left(\frac{3 + 4i}{4 - 5i}\right)$
9. Find the modulus and argument of $\frac{1 + 2i}{1 - 3i}$
10. If $(a + ib)^2 = (x + iy),$ prove that $(a^2 + b^2)^2 = (x^2 + y^2)$
11. Find x and y if $\frac{(1+i)x - 2i}{3+i} + \frac{(2-3i)y + i}{3-i} = i$
12. For what values of x and y are the numbers $-3 + ix^2y$ and $x^2 + y + 4i$ complex conjugates? (x, y are real numbers.)
13. Solve the following quadratic equations:

(i) $6x^2 - 17ix - 12 = 0$

(ii) $3x^2 + 7ix + 6 = 0$

$(iii) x^2 - (7 - i)x + 18 - i = 0$

$(iv) x^2 - \left(3\sqrt{2} - 2i\right)x - 6\sqrt{2}i = 0$

$(v) 2x^2 - (3 + 7ix)x + 9i - 3 = 0$

14. Find the square root of: $(i) -8 - 6i, (ii) -5 + 12i, (iii) -i$

Ch: Permutations

1. How many even numbers of 3 digits can be formed with the digits 1,2,3,4,6 if no digit is repeated?
2. How many numbers of six digits can be formed from the digits 0,1,3,5,7 and 9, which are divisible by 10 and no digit is repeated?
3. Find the number of different signals that can be generated by arranging at least 2 flags in order (one below the other) on a vertical staff, if five different flags are available.
4. How many numbers greater than 1000 and less than 4000 can be formed with the digits 0,1,2,3,4 if (a) repetition of digits is allowed (b) repetition of digits is not allowed?
5. How many odd numbers greater than 80000 can be formed using the digits 2,3,4,5 and 8 if each digit is used only once in a number?
6. Three dice are rolled. Find the number of possible outcomes in which at least one die shows a 5.
7. Evaluate: (a) $12!-10!$ (b) $\dfrac{9!}{5!\times 4!}$
8. Which of the following is true? (a) $(2+3)!=2!+3!$ (b) $(2\times 3)!=2!\times 3!$
9. Find x, if : $\dfrac{1}{9!}+\dfrac{1}{10!}=\dfrac{x}{11!}$
10. If ${}^{11}P_r={}^{12}P_{r-1}$, find r.
11. Find r, if $5\ {}^{4}P_r=6\ {}^{5}P_{r-1}$
12. If ${}^{2n-1}P_n:{}^{2n+1}P_{n-1}=22:7$, find n.
13. How many words can be made from the letters of the word MONDAY assuming that no letter is repeated if (a) 4 letters are used at a time (b) All letters are used at a time? (c) All letters are used but the first letter is a vowel?
14. The letters of the word TRIANGLE are arranged in such a way that vowel and consonants remain together. How many different arrangements will be obtained?
15. Four different mathematics books, six different physics books and two different chemistry books are to be arranged on a shelf. How many different arrangements are possible if (a) the book in a particular subject must all stand together (b) only the mathematics books must stand together?
16. In how many ways can 5 children be arranged in a row such that two boys Akash and Samir are (a) always together (b) never together?
17. How many different 8 letter words can be formed out of the letters of the word DAUGHTER so that (a) The word starts with D and ends with R (b) Position of H remains unchanged (c) Relative position of vowels and consonants remain unaltered (d) No two vowels are together (e) All vowels never occur together?
18. How many words can be formed with the letters of the word EQUATION? In how many of them (a) vowels occur together (b) the vowels never occur together (c) the vowels and the consonants are together?
19. In how many ways can 5 boys and 3 girls be seated in a row so that no two girls are together?