SAINIK SCHOOL IMPHAL

SUMMER VACATION

2024-25

ASSIGNMENT/PROJECTS

CLASS X

COMPUTER APPLICATIONS

SAINIK SCHOOL IMPHAL

SUMMER VACATION ASSIGNMENT: 2024-25

SUBJECT: COMPUTER APPLICATIONS (165) – CLASS X

Instructions:

- Question I should be written in the Computer Homework Notebook.
- Question II should be done in A4 size paper. Please write only on one side of the page.
- Minimum no. of pages required is 13 pages.

I. Answer the following questions

1. What do you mean by Remote login?
2. Name any two websites which are used to send emails.
3. What is the difference between HTTP and FTP?
4. Explain HTTPS.
5. Differentiate between website and web portal.
6. Mention some disadvantages of e-mail.
7. What are search engines?
8. Name any four website to find people on net.
9. Difference between Internet & www.
10. Difference between a server and a web server.
11. What are the components of a website?
12. What makes a webpage work?
13. What are the advantages of blog?
14. What are the disadvantages of blog?
15. Why TCP/IP is important?
16. How are TCP/IP and IP different?
17. Explain the components of SMTP.
18. Differentiate between HTTP & HTTPS.
19. Differentiate between FTP Server and FTP Client.
20. Explain how search engine works.

II. Write an assignment on the various Internet Protocols. The following Protocols should be included:

- TCP/IP
- SMTP
- POP3
- HTTP
- HTTPS
- SSH
- SFTP
- FTP
- SCP
- TELNET

The sequence of the assignment should be as follows:

- Cover Page
- Contents
- Introduction
- Explaining the various topics

Details are given below.

Cover Page

"Internet Protocols"

Summer Vacation Assignment: 2024-25

Submitted By:
Cdt ….
Adm No ….
Class… Section …

Submitted To:
Sir Tiken
TGT Computer Science

SAINIK SCHOOL IMPHAL

2nd Page

Contents

Introduction

(Write a short note on Inter Protocols in about 200 words)

TCP/IP

(Explain in detail about the TCP/IP in this page in about 200 words.)

SMTP

(Explain in detail about the SMTP in this page in about 200 words.)

POP3

(Explain in detail about the POP3 in this page in about 200 words.)

HTTP

(Explain in detail about the HTTP in this page in about 200 words.)

HTTPS

(Explain in detail about the HTTPS in this page in about 200 words.)

SSH

(Explain in detail about the SSH in this page in about 200 words.)

SFTP

(Explain in detail about SFTP in this page in about 200 words.)

FTP

(Explain in detail about the FTP in this page in about 200 words.)

SCP

(Explain in detail about the SCP in this page in about 200 words.)

TELNET

(Explain in detail about the TELNET in this page in about 200 words.)

MATHEMATICS

Vacation Homework
Class X Maths

Prepare neat and clean concept maps for the following chapter:

1. Real Numbers
2. Polynomials
3. Pair of Linear equation in two variables
4. Quadratic Equation
5. Arithmetic Progressions
6. Triangles
7. Co-ordinate Geometry

Sample concept maps are given below for your reference.

Real Numbers

← Start From Here

Irrational Numbers

$\pi, \sqrt{2}$

Can't be represented as $x = p/q$, Where p & q are integers and $q \neq 0$. Decimal representation is non terminating & non-recurring.

Rational Numbers

$1, 1/2, -7/5...$

Can be represented as $x = p/q$, Where p & q are integers and $q \neq 0$. Decimal representation is either terminating or non-terminating & recurring.

Terminating

$x = p/q$ and $q \neq 0$ (q is in the form of $2^m 5^n$ where m, n are non-negative integers, then it is terminating decimal)

e.g. $\frac{3}{2^2 \times 5} = 0.15$

Non-Terminating

$x = p/q$ and $q \neq 0$ (q is not in the form of $2^m 5^n$ where m, n are non-negative integers, then it is non- terminating decimal)

e.g. $\frac{10}{3} = 3.\bar{3}$

Euclid division Lemma

Given positive integers a and b, there exist unique integers q and r satisfying $a = bq + r$, $0 \leq r < b$.

Euclid division Algorithm

If 'a' and 'b' are positive integers such that $a = bq + r$, then every common divisor of 'a' and 'b' is a common divisor of 'b' and 'r', and vice-versa.

e.g. HCF of 420 & 48

$420 = 48 \times 8 + 36$

$48 = 36 \times 1 + 12$

$36 = 12 \times 3 + 0$

$\Rightarrow$ H.C.F. of 420 & 48 is 12

Fundamental theorem of Arithmetic

Every composite number can be expressed or factorized as a product of primes.

e.g. $48 = 2 \times 2 \times 2 \times 2 \times 3$

$420 = 2 \times 2 \times 3 \times 5 \times 7$

Application

H.C.F

e.g. $48 = \underline{2} \times \underline{2} \times 2 \times 2 \times \underline{3}$

$420 = \underline{2} \times \underline{2} \times \underline{3} \times 5 \times 7$

$H.C.F = 2 \times 2 \times 3$

L.C.M

e.g. $48 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{3}$

$420 = 2 \times 2 \times 3 \times \underline{5} \times \underline{7}$

$L.C.M = 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 7$

$= 1680$

H.C.F. (48, 420) × L.C.M. (48,420)

$= 48 \times 420$

(This is true for 2 numbers only)

e.g. Check whether 6^n can end with the digit 0 for any natural number 'n'.

Sol. Any positive integer ending with the digit zero is divisible by 5 and so its prime factorization must contain the prime 5.

$6^n = (2 \times 3)^n = 2^n \times 3^n$

$\Rightarrow$ The prime in the factorization of 6^n is 2 and 3.

$\Rightarrow$ 5 does not occur in the prime factorization of 6^n for any n.

$\Rightarrow$ 6^n does not end with the digit zero for any natural number n.

Some Important Results :

1. Let 'p' be a prime number and 'a' be a positive integer. If 'p' divides a^2, then 'p' divides 'a'.
2. HCF × LCM = Product of two numbers.
3. LCM is always divisible by HCF.

Polynomials

An algebraic expression f(x) of the form $f(x) = a_0 + a_1x + a_2x^2 + ... + a_nx^n$, where $a_0, a_1, a_2, ..., a_n$ are real numbers and all the index of x are non-negative integers is called polynomials in x and the highest Index n is called the degree of the polynomial.

Quadratic polynomial

$f(x) = ax^2 + bx + c$

Relationship b/w zeros & coefficients

Sum of zeros = $\dfrac{-\text{coefficient of } x}{\text{coefficient of } x^2} = -\dfrac{b}{a}$

Product of zeros = $\dfrac{\text{constant term}}{\text{coefficient of } x^2} = \dfrac{c}{a}$

If zeros of quadratic polynomial is α and β then polynomial is $f(x) = k(x^2 - (\alpha + \beta)x + \alpha\beta)$ where k is any real number.

Cubic polynomial

$f(x) = ax^3 + bx^2 + cx + d$

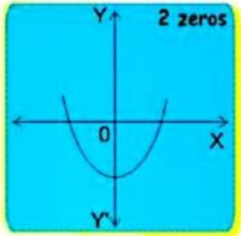
Relationship b/w zeros & coefficients

Sum of zeros = $\dfrac{-\text{coefficient of } x^2}{\text{coefficient of } x^3} = -\dfrac{b}{a}$

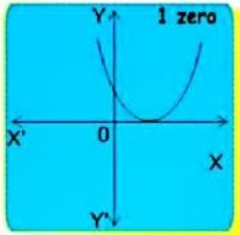
Sum of product of zeros taken two at a time $= \dfrac{\text{coefficient of } x}{\text{coefficient of } x^3} = \dfrac{c}{a}$

Product of zeroes = $\dfrac{-\text{constant term}}{\text{coefficient of } x^2} = -\dfrac{d}{a}$

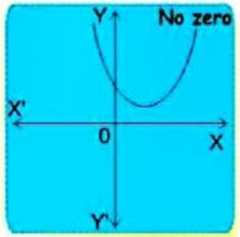
If zeros of cubic polynomial is α, β and γ then polynomial is $f(x) = k(x^3 - (\alpha + \beta + \gamma)x + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma)$ where k is any real number.



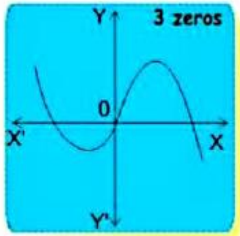
It cuts x axis twice.



It touches x axis.



Doesn't cuts x axis.



It cuts x axis 3 times.

Value of polynomial

The value of a polynomial f(x) at $x = \alpha$ is obtained by substituting $x = \alpha$ in the given polynomial and is denoted by $f(\alpha)$.

e.g. If $f(x) = 2x^3 - 13x^2 + 17x + 12$ then its value at x = 1 is

$f(1) = 2(1)^3 - 13(1)^2 + 17(1) + 12$

$= 2 - 13 + 17 + 12 = 18$

Remainder theorem

If f(x) is a polynomial and 'a' be a real number, then if f(x) is divided by (x-a), then the remainder is equal to f(a).

e.g Find the remainder when $f(x) = x^3 + 6x^2 - 3x + 5$ is divided by $g(x) = x + 2$.

Sol. $x + 2 = 0$

$\Rightarrow x = -2$

Remainder = f(-2)

$= (-2)^3 + 6(-2)^2 - 3(-2) + 5$

$= -8 + 24 + 6 + 5$

$= 27$

Division Algorithm

Dividend = Divisor × Quotient + Remainder

OR

$f(x) = g(x) \times q(x) + r(x)$

Degree of q(x) = deg. f(x) - deg. g(x)

Degree of r(x) < deg. g(x)

Factor theorem

If p(x) is a polynomial and 'a' be a real number, such that p(a) = 0, then (x-a) is a factor of p(x).

e.g. Factors of $f(x) = x^2 - 3x + 2$ is $(x-2)(x-1)$

$\because f(1) = 1^2 - 3(1) + 2 = 1 - 3 + 2 = 0$

$\& f(2) = 2^2 - 3(2) + 2 = 4 - 6 + 2 = 0$

Linear equation in two variables

$a_1x + b_1y + c_1 = 0$ ..(1)

$a_2x + b_2y + c_2 = 0$ ..(2)

Methods to solve

- Algebraic method
- Graphical method

Substitution method

$a_1x + b_1y + c_1 = 0$ ...(i)

$a_2x + b_2y + c_2 = 0$ ...(ii)

From eq. (i) $x = \frac{-c_1 - b_1y}{a_1}$

Substitute x in eq. (ii) and solve.

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ $y = \frac{a_2c_1 - a_1c_2}{a_1b_2 - a_2b_1}$

Elimination method

$a_1x + b_1y + c_1 = 0$ ...(i)

$a_2x + b_2y + c_2 = 0$ ...(ii)

Multiply b_2 in (i) & b_1 in (ii)

$a_1b_2x + b_1b_2y + c_1b_2 = 0$ ..(iii)

$b_1a_2x + b_2b_1y + c_2b_1 = 0$ ..(iv)

(3) -(4) ....

$(a_1b_2 - b_1a_2)x + (c_1b_2 - c_2b_1) = 0$

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ $y = \frac{a_2c_1 - a_1c_2}{a_1b_2 - a_2b_1}$

Cross multiplication method

x	y	1	
b_1	c_1	a_1	b_1
b_2	c_2	a_2	b_2

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - a_1c_2} = \frac{1}{a_1b_2 - a_2b_1}$$

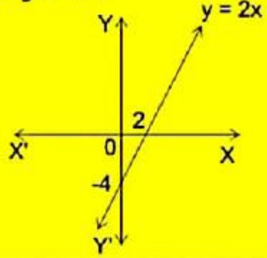
$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ $y = \frac{a_2c_1 - a_1c_2}{a_1b_2 - a_2b_1}$

Equation of a straight line

$ax + by + c = 0$

$\{a \neq 0, b \neq 0 \;\&\; a, b, c \in R\}$

Solution (x,y) → point lying on straight line.



Condition of Solvability of System of Linear Equations

Intersecting (intersect at 1 point)		$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ →	Unique solution (consistent)
Coincident (Coincide)		$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ →	Infinite solution (consistent)
Parallel (No intersection)		$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ →	No solution (inconsistent)

e.g. Six years hence a man's age will be three times the age of his son and three years ago he was nine times as old as his son. Find their present ages.

Sol. Let man's present age be 'x' yrs & son's present age be 'y' yrs.

According to problem

$x + 6 = 3(y + 6)$

$x - 3y = 12$... (i)

and $x - 3 = 9(y - 3)$

$x - 9y = -24$... (ii)

On solving equation (i) & (ii)

$x = 30$ and $y = 6$.

So, the present age of man = 30 years and present age of son = 6 years.

Equations reducible to a pair of linear equations

$\frac{2}{x} + \frac{3}{y} = 13$, $\frac{5}{x} - \frac{4}{y} = -2$

Let $\frac{1}{x} = p$, $\frac{1}{y} = q$

$2p + 3q = 13$

$5p - 4q = -2$

e.g. Solve the following system of linear equations graphically : $x - y = 1$, $2x + y = 8$.

Sol.(i) $x - y = 1$

$x = y + 1$

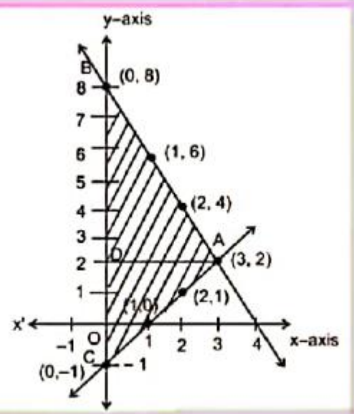
x	0	1	2
y	–1	0	1

(ii) $2x + y = 8$

$y = 8 - 2x$

x	0	1	2
y	8	6	4

Solution is $x = 3$ and $y = 2$



TRIGONOMETRY

Identities

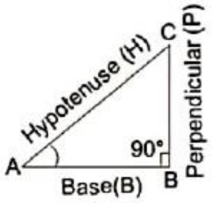
$$\frac{AB^2}{AC^2}+\frac{BC^2}{AC^2}=1=\sin^2A+\cos^2A=1 \leftarrow AC^2$$

$$\frac{AB^2}{BC^2}+1=\frac{AC^2}{BC^2}=\cot^2A+1=\text{cosec}^2A \leftarrow BC^2$$

$$1+\frac{BC^2}{AB^2}=\frac{AC^2}{AB^2}=1+\tan^2A=\sec^2A \leftarrow AB^2$$

Divide both sides by

$AB^2 + BC^2 = AC^2$



e.g. If $\sin 3\theta = \cos(\theta - 6°)$ and 3θ and $\theta - 6°$ are acute, find the value of θ.

Sol. $\sin 3\theta = \cos(\theta - 6°)$

$\Rightarrow \cos(90° - 3\theta) = \cos(\theta - 6°)$

$\Rightarrow 90° - 3\theta = \theta - 6°$

$\Rightarrow 4\theta = 96°$

$\Rightarrow \theta = 24°$.

e.g. If $x = r\sin\theta\cos\phi$, $y = r\sin\theta\sin\phi$, $z = r\cos\theta$, then Prove that : $x^2 + y^2 + z^2 = r^2$.

Sol. $x = r\sin\theta\cos\phi$

$y = r\sin\theta\sin\phi$

$z = r\cos\phi$

$x^2 + y^2 + z^2$

$= r^2\sin^2\theta\cos^2\phi + r^2\sin^2\theta\sin^2\phi + r^2\cos^2\theta$

$= r^2\sin^2\theta(\cos^2\phi + \sin^2\phi) + r^2\cos^2\theta$

$= r^2\sin^2\theta + r^2\cos^2\theta$

$= r^2(\sin^2\theta + \cos^2\theta)$

$= r^2$

T-ratios

$\sin A = \frac{BC}{AC} = \frac{P}{H}$ $\quad$ $\text{cosec}A = \frac{AC}{BC} = \frac{H}{P}$

$\cos A = \frac{AB}{AC} = \frac{B}{H}$ $\quad$ $\sec A = \frac{AC}{AB} = \frac{H}{B}$

$\tan A = \frac{BC}{AB} = \frac{P}{B}$ $\quad$ $\cot A = \frac{AB}{BC} = \frac{B}{P}$

Interrelationship between T-ratios

$\sin A = \frac{1}{\text{cosec}A}$ $\quad$ $\cos A = \frac{1}{\sec A}$ $\quad$ $\tan A = \frac{1}{\cot A}$

Complementary Angles

$\sin(90-A) = \frac{AB}{AC}$	$\tan(90-A) = \frac{AB}{BC}$	$\text{cosec}(90-A) = \frac{AC}{AB}$
$\cos A = \frac{AB}{AC}$	$\cot A = \frac{AB}{BC}$	$\sec A = \frac{AC}{AB}$
$\cos(90-A) = \frac{BC}{AC}$	$\cot(90-A) = \frac{BC}{AB}$	$\sec(90-A) = \frac{AC}{BC}$
$\sin A = \frac{BC}{AC}$	$\tan A = \frac{BC}{AB}$	$\text{cosec}A = \frac{AC}{BC}$

Trigonometric Ratios of Some Specific Angles

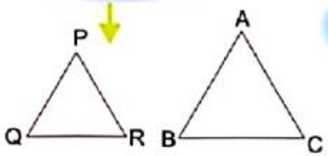
T-ratios \ θ	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined
cot	Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not defined
cosec	Not defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Simplified trigonometric values

Similar Triangles

Similarity Means 'Same shape'
e.g. All circles are similar.
All squares are similar.

Criteria

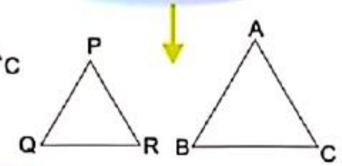


AA criterion :
If $\angle A = \angle P$ and
$\angle B = \angle Q$ then
$\Delta ABC \sim \Delta PQR$.

SSS criterion :
If $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$
then
$\Delta ABC \sim \Delta PQR$

SAS criterion :
If $\frac{AB}{PQ} = \frac{BC}{QR}$ and
$\angle B = \angle Q$ then
$\Delta ABC \sim \Delta PQR$

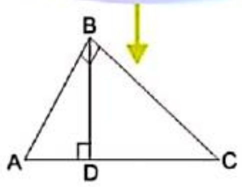
Area theorem



If $\Delta ABC \sim \Delta PQR$:

$$\frac{Area(\Delta ABC)}{Area(\Delta PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{AC}{PR}\right)^2 = \left(\frac{BC}{QR}\right)^2$$

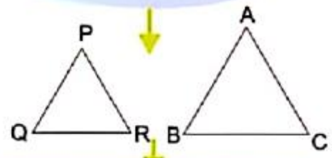
Pythagoras theorem



ΔABC is right angled Δ ($\angle B = 90°$)
$\Delta ABC \sim \Delta BDC \sim \Delta ADB$:
$BC^2 = CD \times AC$ ...(i)
$AB^2 = CA \times AD$ ...(ii)
Add eq. (i) and (ii)
$AB^2 + BC^2 = CA \times AD + CD \times AC$
$AB^2 + BC^2 = AC^2$

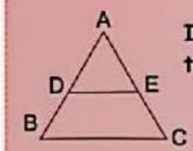
If Δs are similar

Then :



$\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$ and
$\angle A = \angle P$
$\angle B = \angle Q$
$\angle C = \angle R$

Basic Proportionality theorem
(THALES THEOREM)



If DE | | BC
then,
$\frac{AD}{DB} = \frac{AE}{EC}$

Converse of B.P.T. :

If $\frac{AD}{DB} = \frac{AE}{EC}$ then
DE | | BC.

Some Important Results

1. The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle.
2. The diagonals of a trapezium divide each other proportionally.
3. Any line parallel to the parallel sides of a trapezium divides the non-parallel sides proportionally.
4. If three or more parallel lines are intersected by two transversals, then the intercepts made by them on the transversals are proportional.
5. In any triangle, the sum of the squares of any two sides is equal to twice the square of half of the third side together with twice the square of the median which bisects the third side.
6. Three times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the medians of the triangle.

STATISTICS

mode = 3 median - 2 mean

Grouped

Class of Intervals	10-25	25-40	40-55	55-70	70-85	85-100
NO. of Students	2	3	7	6	6	6

MEDIAN

Intervals	No. of students	Cummulative frequency
10-25	2	2
25-40	3	5
40-55	7	(12) c
ℓ (55-70)	(6) f	18
70-85	6	24
85-100	6	30

Median class : Class where c.f. is just greater or equal to n/2

n = 30 ; n/2 = 15

55-70 is median class

lower limit of the median class (ℓ) = 55

c = cum frequency of median preceeding class

Median $= \ell + \frac{n/2 - c}{f} \times h = 62.5$

MODE

Modal Class: Class where frequency is maximum

Class size (h) = 15

Max. frequency $f_1 = 7$, Modal class = 40-55

Lower limit of modal class = 40

$f_0 = 3$ (Previous class f value)

$f_2 = 6$ (next class f value)

Mode $= \ell + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h = 40 + 4/5 \times 15 = 52$

MEAN

3 Methods

Direct Method

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = 62$$

Step deviation

$$\bar{x} = a + h\bar{u}$$

$$\bar{x} = a + h\left(\frac{\sum f_i u_i}{\sum f_i}\right) = 62$$

Assumed mean method

$$\bar{x} = a + \bar{d}$$

$$\bar{x} = a + \left(\frac{\sum f_i d_i}{\sum f_i}\right) = 62$$

Class Intervel	f_i	x_i	$f_i x_i$	$d_i = x_i - a$	$u_i = \frac{x_i - a}{h}$	$f_i u_i$	$f_i d_i$
10-25	2	17.5	35	-30	-2	-4	-60
25-40	3	32.5	97.5	-15	-1	-3	-45
40-55	7	47.5	332.5	0	0	0	0
55-70	6	62.5	375	15	1	6	90
70-85	6	77.5	465	30	2	12	180
85-100	6	92.5	555	45	3	18	270
	30		1860			$\sum f_i u_i = 29$	$\sum f_i d_i = 435$

Ungrouped

MEAN

$$x = \frac{\sum f_i x_i}{\sum f_i}$$

MODE

The value of the observation having the max. frequency

MEDIAN

$x_1, x_2, \ldots\ldots x_n \rightarrow$ observations

$f_1, f_2, \ldots\ldots f_n \rightarrow$ frequencies

n is even: Average of $\left(\frac{n}{2}+1\right)^{th}$ & $\left(\frac{n}{2}\right)^{th}$ observation.

n is odd: $\left(\frac{n+1}{2}\right)^{th}$ observation.

Quadratic Equations

An equation of the form $ax^2 + bx + c = 0$, where a,b,c are real numbers and $a \neq 0$, is called a quadratic equation in x.

Application

1. Speed = $\frac{\text{Distance}}{\text{Time}}$
2. Area of figures
3. Flow rate × time = volume of water
4. Number or ages

e.g. The hypotenuse of a right triangle is 25 cm. The difference between the lengths of the other two sides of the triangle is 5 cm. Find the lengths of these sides.

Sol. Shorter side = x cm, longer side = (x + 5) cm.
hypotenuse = 25 cm
by pythagoras Theorem
$x^2 + (x + 5)^2 = 25^2$
$x^2 + 5x - 300 = 0$
$(x + 20)(x - 15) = 0$
This gives x = 15 or x = - 20.
We reject x = - 20 and take x = 15.
Thus, length of shorter side = 15 cm.
Length of longer side = (15 + 5) cm, i.e., 20 cm.

Solution or Roots of Quadratic Equation

A real number α is called a root of the quadratic equation $ax^2 + bx + c = 0, a \neq 0$ if $a\alpha^2 + b\alpha + c = 0$

Method of finding solution

Factorisation method

In this method $(ax^2 + bx + c)$ be expressible as the product of two linear expression , say $(px + q)$ and $(rx + s)$, where p, q, r are real numbers such that $p \neq 0$ and $r \neq 0$

Then $ax^2 + bx + c = 0 \Rightarrow (px + q)(rx + s) = 0$

$\Rightarrow (px + q) = 0$ or $(rx + s) = 0$

$\Rightarrow x = -\frac{q}{p}$ or $x = -\frac{s}{r}$

Completing the square method

$ax^2 + bx + c = 0, a \neq 0.$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$x^2 + \frac{b}{a}x = -\frac{c}{a}$$

$$x^2 + 2\left(\frac{b}{2a}\right)x + \left(\frac{b}{2a}\right)^2 = \left(\frac{b}{2a}\right)^2 - \frac{c}{a}$$

$$\left(x + \frac{b}{2a}\right)^2 = \left(\frac{b}{2a}\right)^2 - \frac{c}{a}$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

$$x + \frac{b}{2a} = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}}$$

Obtain the values of x by shifting the constant term $\frac{b}{2a}$ on RHS

Nature of roots

$ax^2 + bx + c = 0$, where $a \neq 0$
$D = (b^2 - 4ac)$. and the roots are given by

$$\alpha = \frac{-b + \sqrt{D}}{2a} \text{ and } \beta = \frac{-b - \sqrt{D}}{2a}$$

Case - I
When D > 0, roots are real distinct and given by

$$\alpha = \frac{-b + \sqrt{D}}{2a} \text{ and } \beta = \frac{-b - \sqrt{D}}{2a}$$

Case - II
When D = 0, roots are real and equal and roots are given by

$$\alpha = \beta = -\frac{b}{2a}$$

Case - III
When D < 0, roots are not real.

Quadratic formula :

for $ax^2 + bx + c = 0$,
$D = b^2 - 4ac$

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

Arithmetic Progressions

Selection of Terms :

Taken 3 terms in A.P. :
$(a - d),\ a,\ (a + d)$

Taken 4 terms in A.P. :
$(a - 3d), (a - d), (a + d), (a + 3d)$

Taken 5 terms in A.P. :
$(a - 2d), (a - d), a, (a + d), (a + 2d)$

n^{th} Term

$T_n = a + (n-1)\, d.$

If 2,5,8,..... are in A.P.

$a_1 \rightarrow a_1 = 2 \rightarrow 1^{st}$ Term

$a_2 \rightarrow a_1 + d = 5 \rightarrow 2^{nd}$ Term

$a_3 \rightarrow a_1 + 2d = 8 \rightarrow 3^{rd}$ Term

.

$a_n \rightarrow a_1 + (n-1)d = 74 \rightarrow 25^{th}$ Term

Sum of n Terms

Sum of 1^{st} n terms of an A.P. $\rightarrow S_n$

$S_n = a_1 + a_2 + a_3 + \ldots + a_{n-1} + a_n.$

$S_n = \frac{n}{2}\,[2a + (n-1)d] = \frac{n}{2}\,[a_1 + a_n].$

e.g. If 2,5,8,..... are in A.P. then
$a = 2$ and $d = 3$

$S_{25} = \frac{25}{2}\,[2(2) + (25-1)3] = 950$

Properties

1. If any nth term of a sequence is a linear expression in n e.g. $a_n = An + B$, then the given sequence is an A.P.
2. If a constant term is added to or subtracted from each term of an A.P. then the resulting sequence is also an A.P. with the same common difference.
3. If each term of a given A.P. is multiplied or divided by a non-zero constant K, then the resulting sequence is also an A.P. with common difference Kd or respectively. Where d is the common difference of the given A.P.
4. In a finite A.P. the sum of the terms equidistant from the beginning and end is always same and is equal to the sum of 1st and last term.

Results

Sum of n natural nos.

$S_n = \frac{n(n+1)}{2}$

e.g. Sum of first 7 natural nos. $\Rightarrow \frac{7 \times 8}{2} = 28$

m^{th} term from end

$(n - m + 1)^{th}$ term from start

Find A.P. whose n^{th} term is given ?

e.g. $T_n = 3n + 5$
put $n = 1,2,3$......
$T_1 = 8,\ T_2 = 11,\ T_3 = 14$......

Find T_n when S_n is given

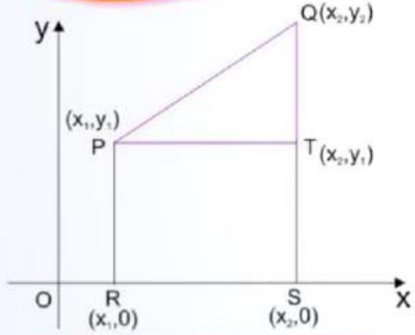
$T_n = S_n - S_{n-1}$
e.g. $S_n = n^2 + 2n$
$\therefore\ T_n = 2n + 1$

Condition of an A.P.

If a, b, c are 3 terms of an A.P. then :
$a + c = 2b$.

COORDINATE GEOMETRY

Distance formula



$RS = (x_2 - x_1) = PT$

$SQ = y_2$; $ST = y_1$; $QT = (y_2 - y_1)$

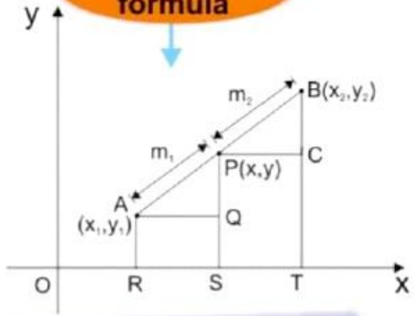
Applying Pythagoras in ΔPTQ

$PQ^2 = PT^2 + QT^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

(Distance formula)

Section formula



Coordinates of P(x,y) =

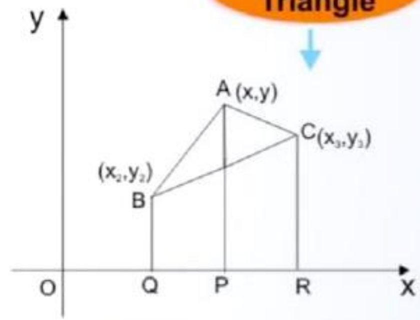
($m_1 : m_2$ Internally)

$$\left\{\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right\}$$

($m_1 : m_2$ externally)

$$\left\{\frac{m_1x_2 - m_2x_1}{m_1 - m_2}, \frac{m_1y_2 - m_2y_1}{m_1 - m_2}\right\}$$

Area of Triangle



$A(x_1y_1)$ $B(x_2,y_2)$ $C(x_3,y_3)$

$$\text{Area} = \frac{1}{2}\,|\,x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\,|$$

If Area = 0,

then points are **collinear**

Applications

Verifying collinearity

$A(x_1,y_1)$, $B(x_2,y_2)$, $C(x_3,y_3)$

→ Find AB,BC,CA using distance formula

→ If AB + BC = CA

or BC + CA = AB

or AB + CA = BC

→ Then 3 points are collinear

(i) For an equilateral triangle - Prove that three sides are equal.

(ii) For a right-angled triangle - Prove that the sum of the squares of two sides is equal to the square of the third side.

(iii) For a square - Prove that the four sides are equal, two diagonals are equal.

(iv) For a rhombus - Prove that four sides are equal.

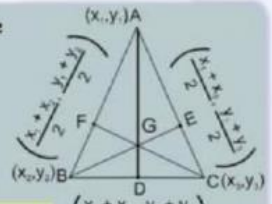
(v) For a rectangle - Prove that the opposite sides are equal and two diagonals are equal.

(vi) For a parallelogram - Prove that the opposite sides are equal

Centroid of Triangle

Coordinates of the centroid of the triangle whose vertices are (x_1, y_1), (x_2, y_2) and (x_3, y_3) are

$$\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

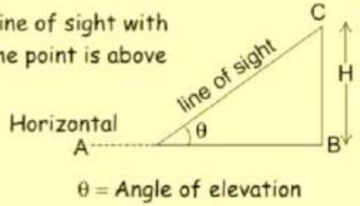


$$\left(\frac{x_2 + x_3}{2}, \frac{y_2 + y_3}{2}\right)$$

Heights & Distances

Angle of Elevation

Angle formed by the line of sight with the horizontal when the point is above the horizontal.



Height of tower
BC = AB × tan θ
(given AB & θ)

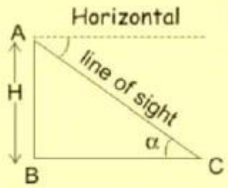
θ = Angle of elevation

Applications

- @ Navigation
- @ Land surveys
- @ Buildings
- @ Optics
- @ Statics
- @ Crystallography

Angle of Depression

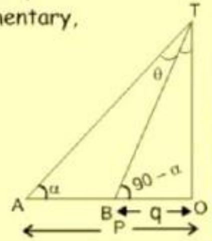
Angle formed by the line of sight with the horizontal when the point is below the horizontal.



Height of tower
AB = tan α × BC
(given α & BC)

α = Angle of Depression

The angle of elevation of the top of a tower, as seen from two points A & B situated in the same line and at distances 'p' and 'q' respectively from the foot of the tower, are complementary, then show that the height of the tower is $\sqrt{pq}$



Sol. In ΔAOT,

$\tan\alpha = \frac{OT}{OA} = \frac{h}{p}$ .... (I)

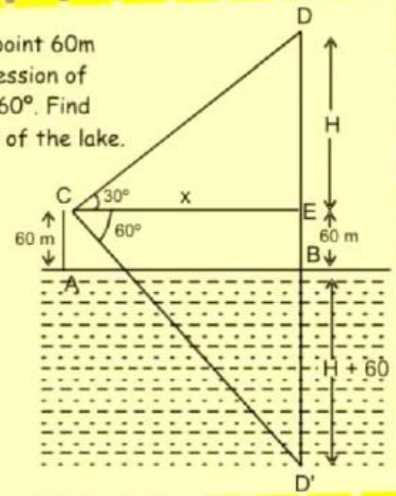
In ΔBOT

$\Rightarrow \tan(90-\alpha) = \frac{OT}{OB} = \frac{h}{q}$ or $\cot\alpha = \frac{h}{q}$ ....(ii)

Multiplying (i) and (ii) , we have

$\Rightarrow \tan\alpha\cot\alpha = \frac{h}{p}\times\frac{h}{q} \Rightarrow 1 = \frac{h^2}{pq} \Rightarrow h = \sqrt{pq}$

The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud from the surface of the lake.



$\tan 30° = \frac{H}{x} \Rightarrow x = \sqrt{3}H$ ... (i)

$\tan 60° = \frac{H+120}{x} \Rightarrow x = \frac{H+120}{\sqrt{3}}$ ... (ii)

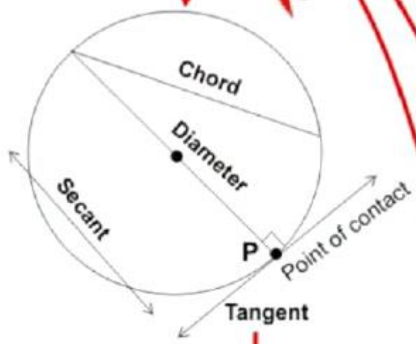
From eq. (i) and (ii)

$3H = H + 120$

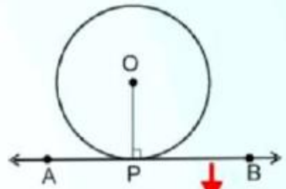
$\Rightarrow H = 60m$

Height of the cloud from the surface of the lake = H + 60 = 60 + 60 = 120m

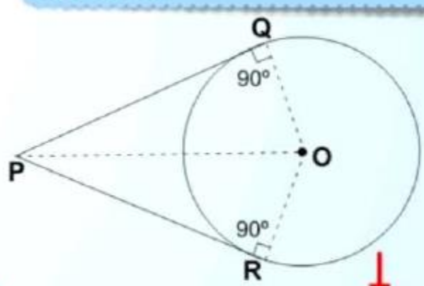
Circles



Special case of secant with only one point of contact.



A tangent to a circle is perpendicular to the radius through the point of contact. i.e. OP ⊥ AB



Length of two tangent drawn from external point are equal

In ΔOQP & ΔORP

$\angle OQP = \angle ORP$ (Each 90°)

$OP = OP$, (Common

$OQ = OR$ (radius)

$\therefore \Delta OQP \cong \Delta ORP \Rightarrow PQ = PR$

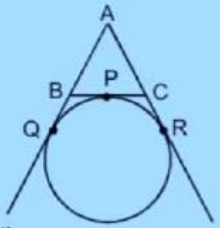
Results :

(i) If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre. $\angle POQ = \angle POR$

(ii) If two tangents are drawn to a circle from an external point, they are equally inclined to the segment, joining the centre to that point $\angle OPQ = \angle OPR$

Applications

A circle touches the side BC of a ΔABC at P and touches AB and AC when produced at Q and R respectively then $AQ = \frac{1}{2}$(Perimeter of ΔABC).



$AQ = AR$....(i)

$BQ = BP$....(ii)

$CP = CR$....(iii)

[Tangents drawn from an external point to a circle are equal]

Now, perimeter of ΔABC

$= AB + BC + CA$

$= AB + BP + PC + CA$

$= (AB + BQ) + (CR + CA)$ [From (ii) and (iii)]

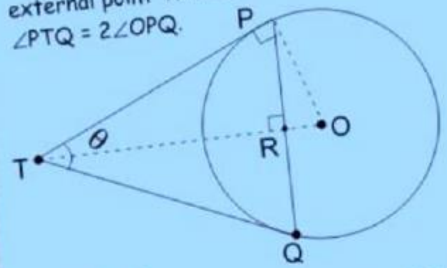
$= AQ + AR = AQ + AQ$ [From(i)]

$AQ = \frac{1}{2}$(Perimeter of ΔABC).

Special Note :

1. If quadrilateral ABCD is circumscribing a circle, then AB + CD = AD + BC.
2. If all the sides of a parallelogram touches a circle, then the parallelogram is a rhombus.

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.



In ΔPTQ

$TP = TQ$, hence $\angle TQP = \angle QPT = 1/2\ (180 - \theta)$

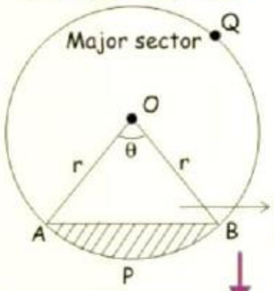
Since $\angle OPT = 90°$, $\angle OPQ = \angle OPT - \angle TPQ$

$\angle OPQ = 90° - \frac{1}{2}(180° - \theta)$

$\Rightarrow \angle PTQ = 2\angle OPQ$.

AREAS RELATED TO CIRCLES

Sector of a circle



→ Generally sector implies minor sector

Length of arc

$\widehat{AB} = \frac{\theta}{360^\circ} \times 2\pi r$

e.g. $\theta = 60^\circ$, $r = 3$ m

$\widehat{AB} = \frac{60^\circ}{360^\circ} \times 2\pi \times 3$

$= \pi$ m

Area of sector

$AOBP = \frac{\theta}{360^\circ} \times \pi r^2$

e.g. $\theta = 60^\circ$, $r = 3$ m

$\text{Area} = \frac{60^\circ}{360^\circ} \times \pi \times 3^2$

$= \frac{3\pi}{2}$ m

Area of segment (APB) =

Area of sector (AOB) – Area of ΔAOB

Note:

1. If two circles touch each other externally, then the distance between their centres is equal to sum of their radii.
2. If two circles touch each other internally, then the distance between their centres is equal to difference of their radii.
3. The distance moved by a rotating wheel in one revolution is equal to the circumference of the wheel.

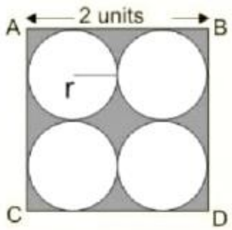
Some Important Formulas :

1. Heron's formula : Area of a triangle = $\sqrt{s(s-a)(s-b)(s-c)}$
   Where s = Semi-perimeter and a, b, c are the sides of the triangle.
2. Area of a triangle = $\frac{1}{2}$ × base × altitude
3. Area of an equilateral triangle = $\frac{\sqrt{3}}{4}a^2$.
4. Area of a rectangle = Length × breadth
6. Area of a square of side 'a' = a^2.
7. Length of diagonal of a square of a side 'a' = $\sqrt{2}a$.
8. Area of a parallelogram = Base × Height
9. Area of a rhombus = $\frac{1}{2}d_1d_2$.

Where d_1 and d_2 are the lengths of its diagonals.

Area of combination of plane figures

e.g.



Sol.

r + r + r + r = length of square

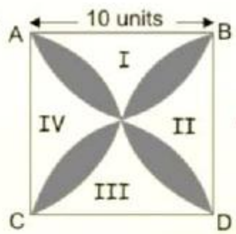
⇒ 4r = 2 ; r = 1/2

Area of shaded reg. = Area of square – Area of 4 circles

$= (2\times2) - 4 \times \frac{\pi(1)^2}{4}$

$= 4 - \pi$

e.g.



Sol.

Area of square ABCD = 10 × 10 = 100 cm²

Ar. (R_1) + Ar. (R_3)

= Ar. square – Ar. two semicircle of radius 5cm

$= 100 - 2\left(\frac{1}{2}\pi(5)^2\right) = 100 - 25\pi$

similarly Ar. (R_2) + Ar. (R_4) = 100 – 25π

So, Area of the shaded region

= Ar. square – (Ar. R_1 + Ar. R_2 + Ar. R_3 + Ar. R_4)

= 100 – (100 – 25π + 100 – 25π)

= (50π – 100) sq. units

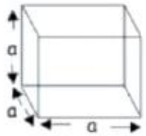
SURFACE AREA & VOLUME

- Cuboid
- Cube
- Cone
- Cylinder
- Sphere
- Hemisphere
- Frustum of a Cone

Cuboid

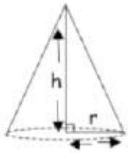
1. T.S.A → $2[lb + bh + hl]$
2. C.S.A → $2[bh + hl]$
3. Volume → $l \times b \times h$
4. Diagonal → $\sqrt{l^2 + b^2 + h^2}$

Cube



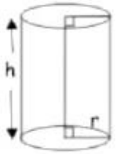
1. T.S.A → $6a^2$
2. C.S.A → $4a^2$
3. Volume → a^3
4. Diagonal → $\sqrt{3}a$

Cone



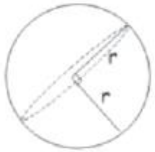
1. T.S.A → $\pi r(\ell + r)$
2. C.S.A → $\pi r \ell$
3. Volume → $\frac{1}{3}\pi r^2 h$

Cylinder



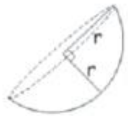
1. T.S.A → $2\pi r(r+h)$
2. C.S.A → $2\pi rh$
3. Volume → $\pi r^2 h$

Sphere



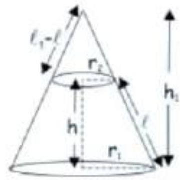
1. C.S.A = T.S.A. = $4\pi r^2$
2. Volume = $\frac{4}{3}\pi r^3$

Hemisphere



1. C.S.A = $2\pi r^2$
2. T.S.A. = $3\pi r^2$
3. Volume = $\frac{2}{3}\pi r^3$

Frustum of a Cone

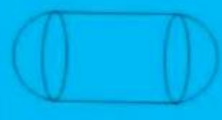


1. C.S.A = $\pi r_1 \ell_1 - \pi r_2(\ell_1 - \ell)$
2. T.S.A. = $\pi \ell(r_1 + r_2) + \pi(r_1^2 + r_2^2)$
3. Volume = $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$
4. Slant height = $\sqrt{h^2 + (r_1 - r_2)^2}$

NOTE :

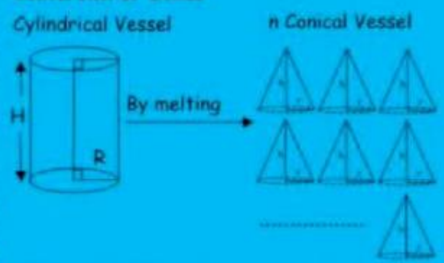
1. C.S.A → Curved surface area
2. T.S.A → Total surface area
3. l → Length
4. b → Breadth
5. h → Height
6. ℓ → Slant height
7. r → Radius
8. a → Side of cube

Volume = Volume of cylinder − Volume of hemisphere



Total surface area = C.S.A. of 2 hemispheres + C.S.A of cylinder

Conversion of Solids



Volume of cylindrical vessel = n volume of 1 conical vessel

$\pi R^2 H = n \times \frac{1}{3}\pi r^2 h$

PROBABILITY

Elementary event (E) :
Only one outcome
sum of the probabilities of all elementary events is 1.

EVENT(E)

$0 \leq P(E) \leq 1$

$P(E) = \frac{\text{No. of outcomes favourable to E}}{\text{No. of all possible outcomes}}$

1st dice → / 2nd dice ↓	36 posibilities in throwing two dices simultaneously					
	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Applications
Gambling, insurance & statistics control theory.

Complimentary Events(E)
Not E = $\bar{E}$, $P(\bar{E}) = 1 - P(E)$
In case 1 :

$P(1) = \frac{1}{6}$; $P(\bar{1}) = 1 - \frac{1}{6} = \frac{5}{6}$
$P(\bar{1})$ = not getting 1 ;
= getting 2,3,4, 5 and 6

Certain event P(E) = 1
Impossible event P(E) = 0
<u>In case 2 :</u>
P(sum 13) is impossible.
hence, P (sum 13) = 0

Examples

Case -1) One dice is rolled:
P(1) = Probability of getting 1.

$P(1) = \frac{1}{6}$

Similarly P(2),P(3), P(4), P(5) & P(6)

$= \frac{1}{6}$

P(E > 4) → Probability of getting 5 & 6.

$P(E > 4)$
$= P(5) + P(6)$

$= \frac{2}{6} = \frac{1}{3}$

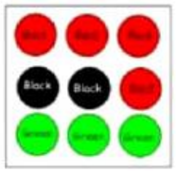
$P(E \leq 4)$
$= P(1) + P(2) + P(3) + P(4)$

$= \frac{4}{6} = \frac{2}{3}$

Case -2) Two dice are rolled:
P(sum = 8) = Probability of getting two numbers whose sum is 8.

Sum = 8 for
(2,6) (3,5) (4,4) (5,3) (6,2)
$P(\text{sum } 8) = \frac{5}{36}$

Case -3) Box with balls :
A box contains 2 black, 3 green and 4 red balls.



Probability of picking up black
$P(B) = \frac{2}{9}$

CONSTRUCTIONS

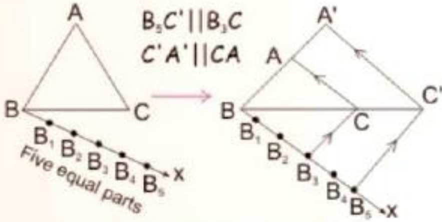
Triangle Scaling

SCALING

1. Scaling up 5/3

$B_5C' \parallel B_3C$

$C'A' \parallel CA$



$\Delta ABC \sim A'BC'$

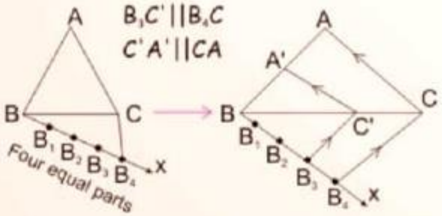
$\frac{AB}{A'B} = \frac{AC}{A'C} = \frac{BC}{BC'}$

$\frac{BC'}{BC} = \frac{BB_5}{BB_3} = \frac{5}{3}$

2. Scaling down 3/4

$B_3C' \parallel B_4C$

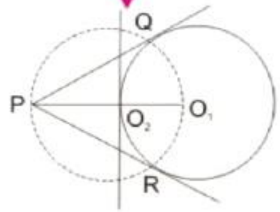
$C'A' \parallel CA$



$\Delta ABC \sim A'BC'$

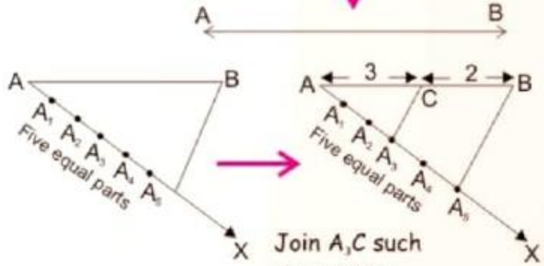
$\frac{A'B}{AB} = \frac{A'C'}{AC} = \frac{BC'}{BC} = \frac{3}{4}$

Constructing Tangents



1. Join PO_1 and bisect it (at O_2)
2. O_2 as centre & O_2O_1 as radius draw a circle
3. 2 circles intersect at Q & R
4. Join PQ & PR (Tangents)

Division of a line segment in m:n(3:2)ratio



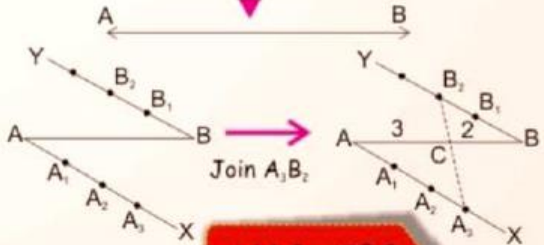
Join A_3C such that A_3C is parallel to A_5B

$\Delta AA_3C \sim \Delta AA_5B$

hence

$\frac{AA_3}{A_3A_5} = \frac{AC}{CB} = \frac{3}{2}$

Alternate-Method



Join A_3B_2

$\Delta AA_3C \sim \Delta BB_2C$

$\frac{AA_3}{BB_2} = \frac{AC}{BC} = \frac{3}{2}$

SUMMER VACATION HOME WORK: CLASS 10: SEC: A,B,C.   SUB: MATHS

SESSION : 2024

The following are the extract from the NCERT Exemplar problems on Mathematics .

Attempt each of these questions sectionwise . Follow the serial number of questions sectionwise.

Sec-A

6. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is

(A) xy (B) xy^2 (C) x^3y^3 (D) x^2y^2

7. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is

(A) ab (B) a^2b^2 (C) a^3b^2 (D) a^3b^3

8. The product of a non-zero rational and an irrational number is

(A) always irrational (B) always rational

(C) rational or irrational (D) one

9. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

(A) 10 (B) 100 (C) 504 (D) 2520

10. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after:

(A) one decimal place (B) two decimal places

(C) three decimal places (D) four decimal places

Sec-B

6. The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is HCF (525, 3000)? Justify your answer.

7. Explain why $3 \times 5 \times 7 + 7$ is a composite number.

8. Can two numbers have 18 as their HCF and 380 as their LCM? Give reasons.

9. Without actually performing the long division, find if $\frac{987}{10500}$ will have terminating or non-terminating (repeating) decimal expansion. Give reasons for your answer.

10. A rational number in its decimal expansion is 327.7081. What can you say about the prime factors of q, when this number is expressed in the form $\frac{p}{q}$? Give reasons.

Sec-C

10. Prove that $\sqrt{3}+\sqrt{5}$ is irrational.

11. Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

12. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

Sec-D

1. Answer the following and justify:

(i) Can $x^2 - 1$ be the quotient on division of $x^6 + 2x^3 + x - 1$ by a polynomial in x of degree 5?

(ii) What will the quotient and remainder be on division of $ax^2 + bx + c$ by $px^3 + qx^2 + rx + s$, $p \neq 0$?

(iii) If on division of a polynomial $p(x)$ by a polynomial $g(x)$, the quotient is zero, what is the relation between the degrees of $p(x)$ and $g(x)$?

(iv) If on division of a non-zero polynomial $p(x)$ by a polynomial $g(x)$, the remainder is zero, what is the relation between the degrees of $p(x)$ and $g(x)$?

(v) Can the quadratic polynomial $x^2 + kx + k$ have equal zeroes for some odd integer $k > 1$?

2. Are the following statements 'True' or 'False'? Justify your answers.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a, b and c all have the same sign.

(ii) If the graph of a polynomial intersects the x-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the x-axis at exactly two points, it need not be a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

Sec-E

1. For each of the following, find a quadratic polynomial whose sum and product respectively of the zeroes are as given. Also find the zeroes of these polynomials by factorisation.

(i) $\frac{-8}{3}, \frac{4}{3}$

(ii) $\frac{21}{8}, \frac{5}{16}$

(iii) $-2\sqrt{3}, -9$

(iv) $\frac{-3}{2\sqrt{5}}, -\frac{1}{2}$

Sec-F

Choose the correct answer from the given four options:

1. Graphically, the pair of equations

$6x - 3y + 10 = 0$

$2x - y + 9 = 0$

represents two lines which are

(A) intersecting at exactly one point. (B) intersecting at exactly two points.
(C) coincident. (D) parallel.

2. The pair of equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ have

(A) a unique solution (B) exactly two solutions
(C) infinitely many solutions (D) no solution

3. If a pair of linear equations is consistent, then the lines will be

(A) parallel (B) always coincident
(C) intersecting or coincident (D) always intersecting

4. The pair of equations $y = 0$ and $y = -7$ has

(A) one solution (B) two solutions
(C) infinitely many solutions (D) no solution

5. The pair of equations $x = a$ and $y = b$ graphically represents lines which are

(A) parallel (B) intersecting at (b, a)
(C) coincident (D) intersecting at (a, b)

6. For what value of k, do the equations $3x - y + 8 = 0$ and $6x - ky = -16$ represent coincident lines?

(A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C) 2 (D) -2

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7. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then the value of k is

(A) $\frac{-5}{4}$ (B) $\frac{2}{5}$ (C) $\frac{15}{4}$ (D) $\frac{3}{2}$

8. The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have infinitely many solutions is

(A) 3 (B) -3 (C) -12 (D) no value

9. One equation of a pair of dependent linear equations is $-5x + 7y = 2$. The second equation can be

(A) $10x + 14y + 4 = 0$ (B) $-10x - 14y + 4 = 0$
(C) $-10x + 14y + 4 = 0$ (D) $10x - 14y = -4$

10. A pair of linear equations which has a unique solution $x = 2, y = -3$ is

(A) $x + y = -1$, $2x - 3y = -5$
(B) $2x + 5y = -11$, $4x + 10y = -22$
(C) $2x - y = 1$, $3x + 2y = 0$
(D) $x - 4y - 14 = 0$, $5x - y - 13 = 0$

11. If $x = a, y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then the values of a and b are, respectively

(A) 3 and 5 (B) 5 and 3
(C) 3 and 1 (D) -1 and -3

12. Aruna has only Re 1 and Rs 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs 75, then the number of Re 1 and Rs 2 coins are, respectively

(A) 35 and 15 (B) 35 and 20
(C) 15 and 35 (D) 25 and 25

13. The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages, in years, of the son and the father are, respectively

(A) 4 and 24 (B) 5 and 30
(C) 6 and 36 (D) 3 and 24

Compile the previous years questions(CBSE Exams) for at least five years chapterwise. It should be retained as personal copies of the cadets.

SOCIAL SCIENCE

Summer vacation assignment 2024-25

Subject : Social Science (Geography)

`1. Draw three outline maps of India on A4 size papers and show the followings:

1st map : (i) Bhakra Nangal dam

(ii) Hirakud dam

(iii) Sadar Sarovar dam

(iv) Tungabhadra dam

(v) Mayurbhanj iron ore mine

(vi) Raniganj coal mine

(vii) Digboi oil field

(viii) Kalpakkam nuclear power plant

2nd map : (i) Mumbai cotton textile centre

(ii) Coimbatore cotton textile centre

(iii) Bokaro iron and steel plant

(iv) Bengaluru software technology park

(v) Pune software technology park

(vi) Noida software technology park

(vii) Vijaynagar iron and steel plant

3rd map : (i) Mumbai sea port

(ii) Kochi sea port

(iii) Tuticorin sea port

(iv) Vishakhapatnam sea port

(v) Meenam Bakkam International Airport

(vi) Rajiv Gandhi International Airport

(vii) Raja Sansi International Airport

Class: X

Answer the following questions. Word Limits: 100 to 150 words.

CONSUMER RIGHTS

1. How does exploitation of consumers take place in the market? Explain with any five facts.
2. “Consumer awareness is essential to avoid exploitation in the market place.” Support the statement.
3. What is ‘Consumer Protection Act’? Explain any three reasons responsible of enacting ‘Consumer Protection Act, 1986′ by the Government of India.

SUSTAINABLE DEVELOPMENT:

4. What is sustainable development, and why is it important for the well-being of present and future generations?
5. What can you as an individual do to reduce your consumption of the various natural resources?

HINDI

<u>ग्रीष्म कालीन अवकाश गृह कार्य</u>

<u>कक्षा 10 (दसवी)   हिंदी</u>

1) बड़े भाई साहब पाठ मे आए मुहावरों की सूची बनाए और उनका अर्थ भी साथ मे लिखकर वाक्यो मे प्रयोग करे।
2) स्वरचित एक कविता और कहानी / निबंध लिखिए।
3) साखी दोहे, मीराबाई के पढ और पर्वत प्रदेश में पावस कविता के कवियो का परिचय लिख कर कविता का सार भी अपने शब्दो में लिखे।

MANIPURI

Sainik School Imphal

Vacation Home Work

Class: x

Subject : Manipuri

Q.1 ꯃꯈꯥꯗ ꯃꯇꯤꯕ ꯁꯣꯕꯁꯨꯂ ꯁꯗꯡꯤꯕꯂ ꯏꯌꯨ ॥ 5×2=10

ꯀ) ꯑꯂꯗꯤꯌꯈꯣ ꯁꯌꯣꯂ ꯂꯥꯄꯤ ꯃꯁꯃ ꯋꯤꯌꯈꯃꯃꯤ

ꯈꯣꯕꯌꯈꯣ ꯇꯩꯈꯣꯕꯄꯤ ꯃꯂꯨꯕ ꯄꯂꯤꯌ ꯋꯤꯌꯈꯃꯃꯤ ॥

ꯁ) ꯃꯤ ꯅꯈꯣꯌꯈꯤꯕꯈ ꯂꯤꯕꯗꯩ ꯅꯈꯣꯌꯈꯤꯕꯈꯄꯤ ꯄꯣꯌꯈꯩ ꯌꯅꯇꯪ ॥ ꯂꯤꯕꯗꯩ ꯈꯕꯃꯈ ꯋꯈꯕꯃꯈꯄꯤ ꯅꯣꯈꯕ-ꯂꯌꯄꯩ ꯗꯣꯕꯇꯪ ॥

Q.2 ꯁꯨꯀꯤ ꯋꯃꯡꯤ ꯀꯁꯌꯨꯈꯤ ꯋꯂꯤꯄꯤ ꯃꯈꯕꯌ ꯇꯩꯈ ꯌꯪꯂꯂꯈ ꯃꯋꯤꯕꯁꯤꯕ ꯋꯡꯨ ꯅꯣꯕꯡꯃꯂꯡꯨꯂ ꯏꯌꯨ ॥ 5

Q.3 ꯌꯃꯑꯣꯅ ꯌꯨꯈꯪꯅꯄꯤ ꯌꯌꯣꯃꯅꯣ ꯂꯣꯌꯈ ꯅꯣꯈꯤꯃꯅꯣ ꯋꯁꯤ ꯂꯁꯣꯄꯤ ꯇꯤꯂꯡ ꯁꯃꯂ ꯏꯌꯨ ॥ 10

Q.4 ꯃꯌꯣꯡ ꯄꯂꯤꯈꯤꯈ ꯄꯣꯌꯈꯩꯁꯤꯕ ꯋꯁꯤ ꯁꯂꯡꯤꯕꯂ ꯌꯣꯕꯌ ॥ 3×5=15

ꯀ) ꯂꯤꯕꯗꯩꯄꯤ ꯂꯣꯀꯤꯕꯡꯤ ꯑꯕꯇꯣꯕꯡ ꯗꯪꯌꯇꯤ ॥

ꯁ) ꯅꯣꯌꯤꯂ ꯅꯣꯕꯇꯄ ꯀꯅꯣꯕꯂ ꯑꯃꯡꯪꯕꯌ ॥

ꯂ) ꯁꯄꯤꯅ ꯃꯃꯣꯕ ꯄꯂꯤꯇꯣꯌ ꯄꯂꯈꯤ, ꯂꯨꯕꯁꯤꯌ ꯃꯣꯌꯈꯃ ꯇꯁꯤꯕ ꯀꯣꯄꯄꯤ ॥

ꯃ) ꯌꯈꯣꯄꯤ ꯅꯩꯁꯨꯂ ꯇꯪꯕꯗꯤꯕ ꯑꯣꯌ ॥

ꯄ) ꯈꯕ ꯌꯤꯅꯇꯄ ꯁꯪꯂꯣꯄꯌꯤ ꯑꯩꯌ ॥

ENGLISH

<u>Holiday Homework</u>

Class 10, Sec-C

Subject-English

Q1. Write a book review on any of the books written by the following authors

a. Arthur Conan Doyle
b. Anton Chekhov
c. Rudyard Kipling
d. R.K Narayan
e. H.G. Wells
f. Ruskin Bond

Q2. Write the textual questions and answers of the chapter *Nelson Mandela – A Long walk to Freedom* in your homework copy.

Q3. Write the summary of the poem *Tiger in the Zoo* along with the literary devices in your homework copy.

SAINIK SCHOOL IMPHAL
SUMMER VACATION ASSIGNMENT
CLASS X-A&B (ENGLISH)
ACADEMIC SESSION 2024-25

Assignment-I

1. **Explain the following literary devices in two or three lines with examples.**
    a. **Simile**
    b. **Metaphor**
    c. **Anaphora**
    d. **Alliteration**
    e. **Assonance**
    f. **Symbolism**
    g. **Imagery**
    h. **Image**
    i. **Paradox**
    j. **Enjambment**
    k. **Transferred epithet**
    l. **Irony**
    m. **Rhyme scheme**
    n. **Onomatopoeia**

Assignment-II

1. **Give two examples of each sub-kind of all tenses.**
2. **Give two examples of each of the following determiners.**
    i. **Quantitative**
    ii. **Demonstrative**
    iii. **Compound determiner (e.g. All the toys are broken)**
3. **Write all Modals in English with one example each.**
4. **i. Write rules of pronoun, adverb (words that show distance and nearness) and tense of Reported Speech.**
   ii. Give two examples each of statement, question and imperative sentences of Reported Speech.

Assignment-III

5. **Write a book review on any one of the following books.**
   i. **The adventures of Huckleberry Finn by Mark Twain**
   ii. **The old man and sea by Ernest Hemingway**
   iii. **Why we can’t wait by Martin Luther King Jr.**

BOOK REVIEW FORMAT

NAME OF CADET:

CLASS: **SECTION:** **ADM NO:**

Brief summary (50 words):

Comments or views or analysis (80 words):

Conclusion (30 words):

SCIENCE

Home Work For Summer Vacation

Class 10 **Subject : Science**

1. Draw ray diagrams showing the image formation by a convex lens and concave lens.

2. Write any two uses of each of convex lens and concave lens i.e. uses in our daily life situations.

3. Draw and learn the following Diagram

(i) Fig 7.1 (a) Structure of neuro

(b) Neuromuscular junction

(ii) Fig. 7.2 Reflex arc

(iii) Fig. 7.3 Human brain

(iv) Fig. 7.5 Response of the plant to the direction of light

(v) Fig. 7.6 Plant showing geotropism

(vi) Fig. 7.7 Endocrine glands in human beings

(a) Male (b) Female

(vii) Fig. 8.3 Reproduction in planaria

(viii) Fig. 8.4 Budding in hydra

(ix) Fig. 8.8 Combination of pollen on stigma

(x) Fig 8.9 Germination

(xi) Fig. 8.10 Human – male reproductive system

(xii) Fig. 8.11 Human – female reproductive system

4. Text question and answer along with the exercise for the chapter Chemical Reactions and Equations

Note:

a) Use A4 size paper for vacation work.

b) Do your vacation work by yourself.

c) Writings and drawing of diagrams should be very good, neat and clean.