LONDON KRISHNAMOORTHI HIGHER SECONDARY SCHOOL,

ORATHANADU

10th

MATHS

Q - BANK (2024-25)

1 - RELATIONS AND FUNCTIONS

2 Marks

1. If $A \times B = \{(3,2),(3,4),(5,2),(5,4)\}$ then find A and B. **Example 1.2**
2. Find $A \times B, A \times A$ and $B \times A$, $(i)\ A = \{2,-2,3\}$ and$B = \{1,-4\}$ $(ii)A = B = \{p,q\}$ $(iii)A = \{m,n\}, B = \emptyset$ **Exe. 1.1-1**
3. Let $A = \{1,2,3\}$ and $B = \{x|x$ is a prime number less than $10\}$. Find $A \times B$ and $B \times A$. **Exe. 1.1-2**
4. $B \times A = \{(-2,3),(-2,4),(0,3),(0,4),(3,3),(3,4)\}$, find $A$and B. **Exe. 1.1-3**
5. Let $A = \{1,2,3,4,\ldots,45\}$and R be the relation defined as "$is\ square\ of$ " on A. Write R as asubset of A x A. Also, find the domain and range of R **Exe. 1.2-2**
6. A Relation R is given by the set $\{(x,y)|\ y = x+3, x \in \{0,1,2,3,4,5\}\}$. Determine its domain and range. **Exe. 1.1-3**
7. $X = \{1,2,3,4\}, Y = \{2,4,6,8,10\}$.Let and and $R = \{(1,2),(2,4),(3,6),(4,8)\}$. Show that R is a function and find its domain, co-domain and range? **Example 1.6**
8. A relation 'f' is defined by $f(x) = x^2 - 2$, where $x \in \{-2,-1,0,3\}$, (i) List the elements of f (ii) Is f a function? **Example 1.7:**
9. Let $f = \{(x,y)|\ x,y \in \mathbb{N}\ and\ y = 2x\}$ be a relation on $\mathbb{N}$. Find the domain, co-domain and range. Is this relation a function? **Exe. 1.3-1**
10. Let X = {3, 4, 6, 8}. Determine whether the relation $R = \{(x,f(x))|x \in X,\ f(x) = x^2 - 1\}$ is a function from X to N? **Exe. 1.3-2**
11. $A = \{-2,-1,0,1,2\}$ and $f: A \to B$ is an onto function defined by $f(x) = x^2 + x + 1$, then find B. **Example 1.14**
12. Show that the function $f: \mathbb{N} \to \mathbb{N}$ defined by $f(x) = 2x - 1$ is one-one but not onto. **Exe. 1.4-4**
13. Let $A = \{1,2,3,4\}$and $B = \mathbb{N}$. Let $f: A \to B$ be defined by $f(x) = x^2$ then, (i)find the range of f (ii) identify the type of function **Exe. 1.4-6**
14. Let f be a function from $\mathbb{R}$ to $\mathbb{R}$ defined by $f(x) = 3x - 5$. Find the values of a and b given that $(a,4)$ and $(1,b)$ belong to f **Exe. 1.4-7**
15. Find $f \circ g$ and $g \circ f$ when $f(x) = 2x + 1$ and $g(x) = x^2 - 2$. **Example 1.19**
16. Represent the function $f(x) = \sqrt{2x^2 - 5x + 3}$as a composition of two functions. **Example 1.20**
17. Find k if $f \circ f(k) = 5$ where $f(k) = 2k - 1$. **Example 1.22**
18. Let $f = \{(-1,3),(0,-1),(2,-9)\}$ be a linear function from $\mathbb{Z}$into $\mathbb{Z}$. Find $f(x)$. **Exe. 1.5-9**
19. Let $f(x) = 2x + 5$. If $x \neq 0$, then find $\frac{f(x+2)-f(x)}{x}$.
20. A function f is defined by $f(x) = 3 - 2x$. Find x such that $f(x^2) = (f(x))^2$.
21. Let f be a function $f: \mathbb{N} \to \mathbb{N}$ be defined by $f(x) = 3x + 2, x \in \mathbb{N}$.
    (i) Find the images of $1,2,3$ (ii) Find the pre-images of $29,53$ (iii) Identify the type of function
22. Represent the function $f = \{(1,2),(2,2),(3,2),(4,3),(5,4)\}$ through (i) an arrow diagram (ii) a table form (iii) a graph

5. Marks

1. Let $A = \{x \in \mathbb{N}|1 < x < 4\}, B = \{x \in \mathbb{W}|0 \leq x < 2\}$ and $C = \{x \in \mathbb{N}|x < 3\}$. Then verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$ **(Example 1.3)**
2. Let $A = \{x \in \mathbb{W}|x < 2\}, B = \{x \in \mathbb{N}|1 < x \leq 4\}$ and $C = \{3,5\}$. Verify that $(A \cup B) \times C = (A \times C) \cup (B \times C)$ **(Exe. 1.1 - 6)**

3. Let $A =$ The set of all natural numbers less than $8, B =$The set of all prime numbers less than $8, C =$ The set of even prime number. Verify that $A \times (B - C) = (A \times B) - (A \times C)$ **(Exe. 1.1 - 7)**
4. Given $f(x) = 2x - x^2$,find $(i)f(1)$ (ii) $f(x+1)$ (iii) $f(x) + f(1)$ **(Example 1.9)**
5. Given the function $f: x \to x^2 - 5x + 6$, evaluate
   $(i)f(-1)$ $(ii)f(2a)$ $(iii)f(2)$ $(iv)f(x-1)$**(Exe. 1.3 - 3)**
6. A function f is defined by $f(x) = 2x - 3$ (i)find$\frac{f(0)-f(1)}{2}$. (ii)find$x$such that $f(x) = 0$. (iii)find$x$such that $f(x) = x$. (iv)find$x$such that $f(x) = f(1-x)$. **(Exe. 1.3 - 6)**
7. Let $A = \{1,2,3,4\}$ and $B = \{2,5,8,11,14\}$be two sets. Let $f: A \to B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form **Example 1.11**
8. If the function $f: \mathbb{R} \to \mathbb{R}$ defined by $f(x) = \begin{cases} 2x+7, & x < -2 \\ x^2 - 2, & -2 \le x < 3 \\ 3x - 2, & x \ge 3 \end{cases}$, then find the values of
   (i) $f(4)$ (ii) $f(-2)$ $(iii)f(4) + 2f(1)$ $(iv)\frac{f(1)-3f(4)}{f(-3)}$ **Example 1.15:**
9. Let $f: A \to B$ be a function defined by $f(x) = \frac{x}{2} - 1$ where $A = \{2,4,6,10,12\}, B = \{0,1,2,4,5,9\}$.
   Represent f by (i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph **Exe. 1.4 -2**
10. In each of the following cases state whether the function is bijective or not. Justify your answer.
    (i) $f: \mathbb{R} \to \mathbb{R}$ defined by $f(x) = 2x + 1$ (ii) $f: \mathbb{R} \to \mathbb{R}$ defined by $f(x) = 3 - 4x^2$
11. Represent each of the given relations by (a) an arrow diagram, (b) a graph and (c) a set in roster form, wherever possible. (i) $\{(x,y) | x = 2y, x \in \{2,3,4,5\}, y \in \{1,2,3,4\}$ (ii) $\{(x,y) | y = x + 3, x, y$ are natural numbers $< 10\}$ **Exe. 1.4 -7**
12. If the function f is defined by $f(x) = \begin{cases} x+2, & if \quad x > 1 \\ 2, & if \quad -1 \le x \le 1 \\ x-1, & if \quad -3 < x < -1 \end{cases}$, find the values of
    (i) $f(3)$ (ii) $f(0)$ $(iii)f(-1.5)$ (iv) $f(2) + f(-2)$ **Exe. 1.4 -9**
13. A function $f: [-5,9] \to \mathbb{R}$ is defined as follows: $f(x) = \begin{cases} 6x+1, & if \quad -5 \le x < 2 \\ 5x^2 - 1, & if \quad 2 \le x < 6 \\ 3x - 4, & if \quad 6 \le x \le 9 \end{cases}$, Find the values of (i) $f(-3) + f(2)$ (ii) $f(7) - f(1)$ (iii) $2f(4) + f(8)$ $(iv)\frac{2f(-2)-f(6)}{f(4)+f(-2)}$ **Exe. 1.4 -10**
14. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by $t(C) = F$where $F = \frac{9}{5}C + 32$. Find, (i) $t(0)$ $(ii)t(28)$ $(iii)t(-10)$ (iv) The value of C when $t(C) = 212$ (v) The temperature when the Celsius value is equal to the Fahrenheit value. **Exe. 1.4 -12**
15. If $f(x) = 3x - 2$, $g(x) = 2x + k$and if $f \circ g = g \circ f$ then find the value of k. **Example 1.21**
16. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$, and $h(x) = 3x$. Prove that $f \circ (g \circ h) = (f \circ g) \circ h$. **Example 1.23**
17. Find x if $gff(x) = fgg(x)$, given $f(x) = 3x + 1$ and $g(x) = x + 3$. **Example 1.24**

2 - NUMBERS AND SEQUENCES

2 Marks:

1. We have 34 cakes. Each box can hold 5 cakes only. How many boxes we need to pack and how many cakes are unpacked? **Example 2.1**
2. Show that the square of an odd integer is of the form $4q + 1$, for some integer q. **Example 2.3**
3. Find all positive integers, when divided by 3 leaves remainder 2. **Exe. 2.1 -1**

4. Prove that the product of two consecutive positive integers is divisible by 2. **Exe. 2.1 -3**
5. When the positive integers a, b and c are divided by 13, the respective remainders are 9,7 and 10. Show that $a + b + c$is divisible by 13.**Exe. 2.1 -4**
6. Can the number $6^n, n$ being a natural number end with the digit 5? Give reason for your answer. **Example 2.8**
7. Is $7 \times 5 \times 3 \times 2 + 3$a composite number? Justify your answer **Example 2.9:**\
8. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'. **Example 2.10**
9. If m, n are natural numbers, for what values of m, does $2^n \times 5^m$ ends in 5?**Exe. 2.2 -2**
10. $If\ 13824 = 2^a \times 3^b\ then\ find\ a\ and\ b$.**Exe. 2.2 -4**
11. Find the least number that is divisible by the first ten natural numbers. **Exe. 2.2 -10**
12. Determine the value of d such that $15 \equiv 3(mod\ d)$. **Example 2.12**
13. Solve $8x \equiv 1(mod\ 11)$. **Example 2.14**
14. Compute x, such that $10^4 \equiv x\ (mod\ 19)$. **Example 2.15**
15. Find the number of integer solutions of $3x \equiv 1(mod\ 15)$. **Example 2.16**
16. What is the time 100 hours after 7 $a.m.$? **Exe. 2.3-5**
17. What is the time 15 hours before 11 $p.m.$? **Exe. 2.3-6**
18. Find the remainder when 2^{81} is divided by 17. **Exe. 2.3-9**
19. The general term of a sequence is defined as $a_n = \begin{cases} n(n+3), & n \in \mathbb{N} \text{ is odd} \\ n^2 + 1, & n \in \mathbb{N} \text{ is even} \end{cases}$ **Example 2.21**
20. Find the first five terms of the following sequence. $a_1 = 1, a_2 = 1, a_n = \frac{a_{n-1}}{a_{n-2}+3}; n \geq 3, n \in \mathbb{N}$. **Example 2.22**
21. Find the first four terms of the sequences whose n^{th} terms are given by $(ii)\ a_n = (-1)^{n+1} n(n+1)$ **Exe. 2.4 - 2**
22. Find the indicated terms of the sequences whose n^{th}terms are given by
$(i)\ a_n = \frac{5n}{n+2};\ a_6$and a_{13} $(ii) a_n = -(n^2 - 4);\ a_4$and a_{11} **Exe. 2.4 - 4**
23. Find a_8 and a_{15} whose n^{th} term is $a_n = \begin{cases} \frac{n^2-1}{n+3}, & n \text{ is even}, n \in \mathbb{N} \\ \frac{n^2}{2n+1}, & n \text{ is odd}, n \in \mathbb{N} \end{cases}$ **Exe. 2.4 - 5**
24. If $a_1 = 1, a_2 = 1$ and $a_n = 2a_{n-1} + a_{n-2}; n \geq 3, n \in \mathbb{N}$. then find the first six terms of the sequence. **Exe. 2.4 - 6**
25. Write an A.P. whose first term is 20 and common difference is 8. **Example 2.24**
26. Find the number of terms in the A.P. $3, 6, 9, 12, \ldots, 111$**Example 2.26**
27. Find the first term and common difference of the Arithmetic Progressions whose n^{th} terms are given below $(i) t_n = -3 + 2n$ $(ii)\ t_n = 4 - 7n$ **Exe. 2.5 - 3**
28. Find the 19^{th} term of an A.P. $-11, -15, -19, \ldots\ldots$ **Exe. 2.5 - 4**
29. Which term of an A.P. $16, 11, 6, 1, \ldots$ is -54 ? **Exe. 2.5 - 5**
30. Find the middle term(s) of an A.P. $9, 15, 21, 27, \ldots, 183$. **Exe. 2.5 - 6**
31. If $3 + k, 18 - k, 5k + 1$ are in A.P. then find k **Exe. 2.5 - 7**\
32. Find the sum of first 15 terms of the A. P. $8, 7\frac{1}{4}, 6\frac{1}{2}, 5\frac{3}{4}, \ldots\ldots\ldots$ **Example 2.31**
33. Find the sum of $0.40 + 0.43 + 0.46 + \ldots\ldots + 1$**Example 2.32**
34. n an A.P. the sum of first n terms is $\frac{5n^2}{2} + \frac{3n}{2}$. Find the 17^{th} term **Example 2.35**
35. Find the sum of the following (i) 3,7,11, ... up to 40 terms. (ii) 102,97,92, ...up to 27terms.
$(iii)\ 6 + 13 + 20 + \ldots\ldots\ldots + 97$ **Exe. 2.6 - 1**
36. Find the sum of first 28 terms of an A.P. whose n^{th} term is $4n - 3$. **Exe. 2.6 - 3**

37. The sum of first n terms of a certain series is given as $2n^2 - 3n$. Show that the series is an A.P. **Exe. 2.6 - 4**
38. Find the 8^{th} term of the G.P. $9, 3, 1, \ldots \ldots$ **Example 2.42**:
39. In a G.P. $729, 243, 81, \ldots$ find t_7.**Exe. 2.7 - 3**
40. Find the sum $3 + 1 + \frac{1}{3} + \ldots \ldots \ldots + \infty$**Example 2.49**
41. Find the sum of first six terms of the G.P. $5, 15, 45, \ldots \ldots \ldots$**Exe. 2.8 - 2**
42. Find the sum to infinity of $(i)\ 9 + 3 + 1 + \ldots \ldots$ **Exe. 2.8 - 4**
43. Find the value of $(i)\ 1 + 2 + 3 + \ldots \ldots \ldots + 50$ $(ii)\ 16 + 17 + 18 + \ldots \ldots \ldots \ldots + 75$ **Example 2.54**
44. Find the sum of $(i)\ 1 + 2 + 3 + \ldots \ldots \ldots + to\ 40 terms$ $(ii)\ 2 + 4 + 6 + \ldots \ldots \ldots \ldots + 80$ $(iii)\ 1 + 3 + 5 + \ldots \ldots \ldots \ldots + 55$ **Example 2.55**
45. Find the sum of the following series $(ii)\ 3 + 6 + 9 + \ldots \ldots \ldots \ldots + 96$ $(iv)\ 1 + 4 + 9 + 16 + \ldots \ldots \ldots \ldots + 225$ **Exe. 2.9 - 1**

5 Marks

1. Find the $15^{th}, 24^{th}$ and n^{th} term (general term) of an A.P. given by $3, 15, 27, 39, \ldots$ **Example 2.25**
2. Determine the general term of an A.P. whose 7^{th} term is -1 and 16^{th} term is 17. **Example 2.27**:
3. If l^{th}, m^{th} and n^{th} terms of an A.P. are x, y, z respectively, then show that $(i)\ x(m-n) + y(n-l) + z(l-m) = 0$ $(ii)(x-y)n + (y-z)l + (z-x)m = 0$ **Example 2.28**
4. In an A.P., sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers. **Example 2.29**
5. A mother devides ₹ 207into three parts such that the amount are in A.P. and gives it to her three children. The product of the two least amounts that the children had ₹ 4623. Find the amount received by each child **Example 2.30**
6. If nine times ninth term is equal to the fifteen times fifteenth term, show that six times twenty fourth term is zero. **Exe. 2.8 - 7**
7. The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms. **Exe. 2.8 - 11**
8. The ratio of $6^{th}$and 8^{th}term of an A.P. is 7: 9. Find the ratio of 9^{th} term to 13^{th}term. **Exe. 2.8 - 12**
9. In a winter season let us take the temperature of Ooty from Monday to Friday to be in A.P. The sum of temperatures from Monday to Wednesday is $0°C$ and the sum of the temperatures from Wednesday to Friday is $18°C$. Find the temperature on each of the five days. **Exe. 2.8 - 13**
10. The 13^{th} term of an A.P. is 3 and the sum of first 13 terms is 234. Find the common difference and the sum of first 21 terms. **Example 2.34**
11. Find the sum of all natural numbers between 300 and 600 which are divisible by 7. **Example 2.36**
12. The houses of a street are numbered from 1 to 49. Senthil's house is numbered such that the sum of numbers of the houses prior to Senthil's house is equal to the sum of numbers of the houses following Senthil's house. Find Senthil's house number? **Example 2.38**
13. The sum of first $n, 2n$and $3n$terms of an A.P. are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$**Example 2.39**
14. The 104^{th} term and 4^{th} term of an A.P. are 125and 0. Find the sum of first 35 terms. **Exe. 2.6 - 5**
15. Find the sum of all odd positive integers less than 450. **Exe. 2.6 - 5**
16. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4. **Exe. 2.6 - 7**
17. A brick staircase has a total of 30 steps. The bottom step requires 100bricks. Each successive step requires two bricks less than the previous step. (i) How many bricks are required for the top most step? (ii) How many bricks are required to build the stair case? **Exe. 2.6 - 10**

18. If $S_1, S_2, S_3, \ldots\ldots, S_m$ are the sums of $n$terms of $m\ A.P.$'s whose first terms are1,2,3, ……, $m$and whose common differences are 1,3,5, ……, $(2m-1)$ respectively, then show that $S_1 + S_2 + \ldots\ldots\ldots + S_m = \frac{1}{2}mn(mn+1)$ to terms . **Exe. 2.6 - 11**
19. Find the sum $\left[\frac{a-b}{a+b} + \frac{3a-2b}{a+b} + \frac{5a-3b}{a+b} + \ldots\ldots\ldots to\ 12\ terms\right]$. **Exe. 2.6 - 12**
20. In a Geometric progression, the 4^{th} term is $\frac{8}{9}$ and the 7^{th} term is $\frac{64}{243}$. Find the Geometric Progression. **Example 2.43**
21. The product of three consecutive terms of a Geometric Progression is 343 and their sum is $\frac{91}{3}$. Find the three terms **Example 2.44**
22. In a G.P. the 9^{th} term is 32805 and 6^{th} term is 1215. Find the 12^{th} term. **Exe. 2.7 - 6**
23. Find the 10^{th} term of a G.P. whose 8^{th} term is 768 and the common ratio is 2. **Exe. 2.7 - 7**
24. In a G.P. the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is $\frac{57}{2}$. Find the three terms. **Exe. 2.7 - 9**
25. Find the sum to n terms of the series $5 + 55 + 555 + \ldots\ldots\ldots$ **Example 2.51:**
26. Find the sum to $n$terms of the series $(i)\ 0.4 + 0.44 + 0.444 + \ldots\ldots\ldots\ldots$to n terms $(ii)\ 3 + 33 + 333 + \ldots\ldots\ldots\ldots$to n **Exe. 2.8 - 6**
27. If$S_n = (x+y) + (x^2 + xy + y^2) + (x^3 + x^2y + xy^2 + y^3) + \ldots\ldots\ldots + n$ terms then prove that $(x-y)S_n = \left[\frac{x^2(x^n-1)}{x-1} - \frac{y^2(y^n-1)}{y-1}\right]$. **Exe. 2.8 - 10**
28. If $1 + 2 + 3 + \ldots\ldots\ldots + k = 325$, then find $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots\ldots + k^3$. **Exe. 2.9 - 2**
29. If $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots\ldots + k^3 = 44100$,then find $1 + 2 + 3 + \ldots\ldots\ldots + k$. **Exe. 2.9 - 3**
30. How many terms of the series$1^3 + 2^3 + 3^3 + \ldots\ldots\ldots$ should be taken to get the sum14400? **Exe. 2.9 - 4**
31. The sum of the cubes of first *n* natural numbers is 2025, then find the value of *n*. **Exe. 2.9 - 5**
32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, …, 24 cm. How much area can be decorated with these colour papers? **Exe. 2.9 - 6**

3 – ALGEBRA
2 Marks

1. The father's age is six times his son's age. Six years hence the age of father will be four times his son's age. **Example 3.1**
2. Solve $2x - 3y = 6, x + y = 1$. **Eg 3. 2**
3. Find the LCM of the following
   $(i)\ 8x^4y^2,\ 48x^2y^4$ $(ii)\ 5x - 10, 5x^2 - 20$ **Eg 3.12**
4. Find the LCM of the given expressions.
   $(i)\ 4x^2y,\ 8x^3y^2$ $(ii)\ 9a^3b^2,\ 12a^2b^2c$ $(iii)\ 16m, -12m^2n^2,\ 8n^2$
   $(iv)\ p^2 - 3p + 2, p^2 - 4.$ $(v)\ 2x^2 - 5x - 3,\ 4x^2 - 36$ **Ex. 3.2 -2**
5. Find the LCM and GCD for the following and verify that
   $(i)\ 21x^2y,\ 35xy^2$ $(ii)\ (x^3 - 1)(x + 1),\ (x^3 + 1)$ $(iii)(x^2y + xy^2), (x^2 + xy)$. **Ex. 3.3-1**
6. Reduce the rational expressions to its lowest form
   $(i)\frac{x-3}{x^2-9}$ $(ii)\frac{x^2-16}{x^2+8x+16}$ **Eg 3.13**
7. Find the excluded values of the following expressions (if any).
   $(i)\frac{x+10}{8x}$ $(ii)\frac{7p+2}{8p^2+13p+5}$ $(iii)\frac{x}{x^2+1}$ **Eg 3.14**
8. Find $(ii)\frac{x^2-16}{x+4} \div \frac{x-4}{x+4}$ **Eg 3.16**
9. Simplify $(i)\frac{x(x+1)}{x-2} + \frac{x(1-x)}{x-2}$ $(ii)\ \frac{x+2}{x+3} + \frac{x-1}{x-2}$ $(iii)\frac{x^3}{x-y} + \frac{y^3}{y-x}$ **Ex. 3.6 -1**

10. Find the square root of the following expressions
$(i)\ 256(x-a)^8(x-b)^4(x-c)^{16}(x-d)^{20}$ $(ii)\ \frac{144a^8b^{12}c^{16}}{81f^{12}g^4h^{14}}$ **Eg 3.19**
11. Find the square root of the following
$(i)\ 4x^2+20x+25\ (ii)\ 9x^2-24xy+30xz-40yz+25z^2+16y^2$ **Ex 3.7 - 2**
12. Find the zeroes of the quadratic expression $x^2+8x+12$. **Eg 3.23**
13. Determine the quadratic equations, whose sum and product of roots are $(i)-9,\ 2\ (ii)\frac{5}{3},4$ **Ex. 3.9 -1**
14. Find the sum and product of the roots for each of the following quadratic equations:
$(i)x^2+8x-65=0$ $(ii)\ 2x^2+5x+7=0$ **Eg 3.25**
15. Solve $x^4-13x^2+42=0$. **Eg 3.28**
16. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number. **Ex 3.12 – 1**
17. Determine the nature of roots for the following quadratic equations $(i)x^2-x-20=0$
$(ii)\ 9x^2-24x+16=0$ **Eg 3.40**
18. If a matrix has 16 elements, what are the possible orders it can have? **Eg 3.57**
19. Construct a 3×3 matrix whose elements are $a_{ij}=i^2j^2$. **Eg 3.58**
20. Find the value of a,b,c,d from the equation $\begin{pmatrix}a-b & 2a+c\\ 2a-b & 3c+d\end{pmatrix}=\begin{pmatrix}1 & 5\\ 0 & 2\end{pmatrix}$. **Eg 3.59**
21. If a matrix has 18 elements, what are the possible orders it can have? What if it has 6 elements? **Ex. 3.9 -3**
22. Construct a 3×3 matrix whose elements are given by $(i)a_{ij}=|i-2j|$ **Ex. 3.17 -4**
23. If $A=\begin{pmatrix}\sqrt{7} & -3\\ -\sqrt{5} & 2\\ \sqrt{3} & -5\end{pmatrix}$, then find the transpose of $-A$. **Ex. 3.17 -5**
24. If $A=\begin{pmatrix}5 & 2 & 2\\ -\sqrt{17} & 0.7 & \frac{5}{2}\\ 8 & 3 & 1\end{pmatrix}$, then verify $(A^T)^T=A$. **Ex. 3.17 -6**
25. Find the values of $x,y$and z from the equations $\begin{pmatrix}12 & 3\\ x & 5\end{pmatrix}=\begin{pmatrix}y & z\\ 3 & 5\end{pmatrix}$ **Ex. 3.17 -7**
26. If $A=\begin{pmatrix}7 & 8 & 6\\ 1 & 3 & 9\\ -4 & 3 & -1\end{pmatrix}, B=\begin{pmatrix}4 & 11 & -3\\ -1 & 2 & 4\\ 7 & 5 & 0\end{pmatrix}$ then find $2A+B$. **Eg 3.63**
27. If $A=\begin{pmatrix}5 & 4 & -2\\ \frac{1}{2} & \frac{3}{4} & \sqrt{2}\\ 1 & 9 & 4\end{pmatrix}, B=\begin{pmatrix}-7 & 4 & -3\\ \frac{1}{4} & \frac{7}{2} & 3\\ 5 & -6 & 9\end{pmatrix}$ then find $4A-3B$. **Eg 3.64**
28. If$A=\begin{pmatrix}1 & 2 & 0\\ 3 & 1 & 5\end{pmatrix}, B=\begin{pmatrix}8 & 3 & 1\\ 2 & 4 & 1\\ 5 & 3 & 1\end{pmatrix}$, find AB. **Eg 3.67**
29. If $A=\begin{pmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{pmatrix}$ prove that $AA^T=I$. **Ex. 3.19 -9**
30. 10. Verify that $A^2=I$ when $A=\begin{pmatrix}5 & -4\\ 6 & -5\end{pmatrix}$. **Ex. 3.97 -10**

5 Marks

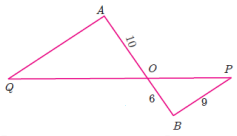
1. Solve the following system of linear equations in three variables
$(i)\ x+y+z=5, 2x-y+z=9, x-2y+3z=16$ **Ex. 3.1 – 1**
2. Vani, her father and her grandfather have an average age of 53. One-half of her grandfather's age plus one-third of her father's age plus one fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now? **Ex. 3.1 – 3**
3. Solve $3x+y-3z=1, -2x-y+2z=1, -x-y+z=2$. **Eg 3.6**
4. Find the GCD of $6x^3-30x^2+60x-48$ and $3x^3-12x^2+21x-18$. **Eg3.11**
5. Find the GCD of the given polynomials

6. $(iii)\ 3x^4+6x^3-12x^2-24x, 4x^4+14x^3+8x^2-8x$
   $(iv)\ 3x^3+3x^2+3x+3, 6x^3+12x^2+6x+12$ **Ex. 3.2 – 1**
7. If $x=\frac{a^2+3a-4}{3a^2-3}$ and $y=\frac{a^2+2a-8}{2a^2-2a-4}$ find the value of x^2y^{-2}. **Ex. 3.2 – 1**
8. Simplify $\frac{1}{x^2-5x+6}+\frac{1}{x^2-3x+2}-\frac{1}{x^2-8x+15}$. **Eg3.18**
9. If $A=\frac{2x+1}{2x-1}, B=\frac{2x-1}{2x+1}$ find $\frac{1}{A-B}-\frac{2B}{A^2-B^2}$. **Ex. 3.5 – 5**
10. If $A=\frac{x}{x+1}, B=\frac{1}{x+1}$ prove that $\frac{(A+B)^2+(A-B)^2}{A/B}=\frac{2(x^2+1)}{x(x+1)^2}$. **Ex. 3.5 – 6**
11. Find the square root of $64x^4-16x^3+17x^2-2x+1$. **Eg 3.21**
12. If $9x^4+12x^3+28x^2+ax+b$ is a perfect square, find the values of a and b. **Eg 3.22**
13. Find the square root of the following
    $(i)x^4-12x^3+42x^2-36x+9$ $(ii)\ 37x^2-28x^3+4x^4+42x+9$
    $(iv)\ 121x^4-198x^3-183x^2+216x+144$ **Ex. 3.8 - 1**
14. Find the values of a and b if the following polynomials are perfect squares
    $(i)\ 4x^4-12x^3+37x^2+bx+a$ $(ii)\ ax^4+bx^3+361x^2+220x+100$ **Ex. 3.8 - 2**
15. *Find the values of m and n if the following expressions are perfect squares*
    (i) $36x^4$ - 60 x^3 + 61 x^2 - m x + n $(ii)x^4-8x^3+mx^2+nx+16$ **Ex. 3.8 – 3**
16. Solve $2x^2-3x-3=0$ by formula method. **Eg 3.33**
17. A passenger train takes 1 hr more than an express train to travel a distance of 240 km from Chennai to Virudhachalam. The speed of passenger train is less than that of an express train by 20 km per hour. Find the average speed of both the trains. **Eg 3.39**
18. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/our more it would have taken 30 minutes less for the journey. Find the original speed of the bus. **Ex. 3.12 – 2**
19. Prove that the equation $x^2(p^2+q^2)+2x(pr+qs)x+r^2+s^2=0$ has no real roots. If $ps=qr$,then show that the roots are real and equal. **Eg 3.42**
20. If the roots of $(a-b)x^2+(b-c)x+(c-a)=0$are real and equal, then prove that b, a, c are in arithmetic progression. **Ex. 3.13 – 3**
21. 4. If a, b are real then show that the roots of the equation $(a-b)x^2-6(a+b)x-9(a-b)=0$ are real and unequal. **Ex. 3.13 – 4**
22. If the roots of the equation $(c^2-ab)x^2-2(a^2-bc)x+b^2-ac=0$ are real and equal prove that either $a=0\ (or) a^3+b^3+c^3=3abc$. **Ex. 3.13 – 5**
23. If α, β are the roots of $7x^2+ax+2=0$and if $\beta-\alpha=\frac{-13}{7}$. Find the values of a. **Ex. 3.14 – 4**
24. If one root of the equation $2y^2-ay+64=0$is twice the other then find the values of a. **Ex. 3.14 – 5**
25. If one root of the equation $3x^2+kx+81=0$ (having real roots) is the square of the other then find k. **Ex. 3.14 – 6**
26. Find X and Y if $X+Y=\begin{pmatrix}7 & 0\\ 3 & 5\end{pmatrix}$ and $X-Y=\begin{pmatrix}3 & 0\\ 0 & 4\end{pmatrix}$. **Ex. 3.18 – 3**
27. If $A=\begin{pmatrix}1 & -1 & 2\end{pmatrix}$, $B=\begin{pmatrix}1 & -1\\ 2 & 1\\ 1 & 3\end{pmatrix}$and $C=\begin{pmatrix}1 & 2\\ 2 & -1\end{pmatrix}$.Show that$(AB)C=A(BC)$ **Eg 3.71**
28. If $A=\begin{pmatrix}1 & 2 & 1\\ 2 & -1 & 1\end{pmatrix}$ and $B=\begin{pmatrix}2 & -1\\ -1 & 4\\ 0 & 2\end{pmatrix}$show that $(AB)^T=B^TA^T$. **Eg 3.73**
29. If $A=\begin{pmatrix}a & b\\ c & d\end{pmatrix}$and $I=\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}$show that $A^2-(a+d)A=(bc-ad)I_2$. **Ex. 3.19 – 11**
30. If $A=\begin{pmatrix}5 & 2 & 9\\ 1 & 2 & 8\end{pmatrix}, B=\begin{pmatrix}1 & 7\\ 1 & 2\\ 5 & -1\end{pmatrix}$verify that $(AB)^T=B^TA^T$. **Ex. 3.19 – 12**

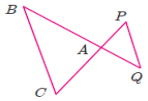
31. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I_2 = 0$ **Ex. 3.19 – 13**

4 – Geometry

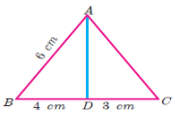
2 Marks



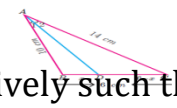
1. In Fig.4.21, QA and PB are perpendiculars to AB.
   If $AO = 10\ cm, BO = 6\ cm$ and $PB = 9\ cm$. Find AQ. **Eg 4.6**
2. The perimeters of two similar triangles ABC and PQR are respectively 36 cm and 24 cm. If $PQ = 10\ cm$, find AB. **Eg 4. 7**
3. If ΔABC is similar to ΔDEF such that $BC = 3\ cm, EF = 4\ cm$ and area of $\Delta ABC = 54\ cm^2$. Find the area of ΔDEF. **Eg4.8**
4. In the adjacent figure, $\Delta ACB \sim \Delta APQ$. If $BC = 8\ cm, PQ = 4\ cm, BA = 6.5\ cm$ and $AP = 2.8\ cm$, find CA and AQ. **Ex. 4.1-6**



5. If $\Delta ABC \sim \Delta DEF$ such that area of ΔABC is 9 cm^2 and the area of ΔDEF is 16 cm^2 and $BC = 2.1\ cm$. Find the length of EF. **Ex. 4.1-8**
6. In ΔABC if $DE \parallel BC, AD = x, DB = x - 2, AE = x + 2$ and $EC = x - 1$ then find the lengths of the sides AB and AC. **Eg 4.12**
7. D and E are respectively the points on the sides AB and AC of a ΔABC such that $AB = 5.6\ cm$, $AD = 1.4\ cm, AC = 7.2\ cm$ and $AE = 1.8\ cm$, show that $DE \parallel BC$. **Eg4.13**
8. In the Fig.4.39, AD is the bisector of $\angle A$.
   If $BD = 4\ cm, DC = 3\ cm$ and $AB = 6\ cm$, find AC. **Eg 4.15**



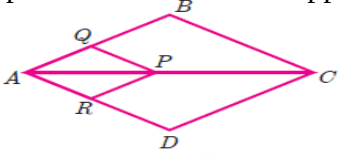
9. In the Fig. 4.40, AD is the bisector of $\angle BAC$,
   If $AB = 10\ cm, AC = 14\ cm$ and $BC = 6\ cm$. Find BD and DC. **Eg 4.16**



10. In $\Delta ABC, D$ and E are points on the sides AB and AC respectively such that $DE \parallel BC$.
    (i) If $\frac{AD}{DB} = \frac{3}{4}$ and $AC = 15\ cm$ find AE. (ii) If $AD = 8x - 7, DB = 5x - 3$, $AE = 4x - 3$ and $EC = 3x - 1$, find the value of x. **Ex. 4.1-1**
11. In $\Delta ABC, D$ and E are points on the sides AB and AC respectively. For each of the following cases show that $DE \parallel BC$. $(i)\ AB = 12\ cm, AD = 8\ cm, AE = 12\ cm$ and $AC = 18\ cm$. $(ii)\ AB = 5.6\ cm, AD = 1.4\ cm, AC = 7.2\ cm$ and $AE = 1.8\ cm$. **Ex. 4.2-3**
12. Check whether AD is bisector of $\angle A$ of ΔABC in each of the following (i) AB=5cm, AC= 10cm , BD=1.5 cm and CD= 3.5 cm. (ii)AB=4 cm, AC=6cm, BD= 1.6cm and CD=2.4 cm. **Ex. 4.2-8**
13. If radii of two concentric circles are 4 cm and 5 cm then find the length othe chord of one circle which is a tangent to the other circle. **Eg 4.28:**
14. The length of the tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle? **Ex. 4.4-1**

5 Marks

1. A boy of height $90cm$ is walking away from the base of a lamp post at a speed of $1.2m/sec$. If the lamppost is $3.6m$ above the ground, find the length of his shadow cast after 4 seconds. **Eg. 4.4**
2. Two poles of height *'a'* metres and *'b'* metres are *'p'* metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given by $\frac{ab}{a+b}$ metres. **Eg 4.9**
3. In fig. if $PQ \parallel BC$ and $PR \parallel CD$ prove that
   $(i)\ \frac{AR}{AD} = \frac{AQ}{AB}$ $(ii)\ \frac{QB}{AQ} = \frac{DR}{AR}$. **Ex. 4.2-4**



4. In trapezium $ABCD, AB \parallel DC, E$ and F are points on non-parallel sides AD and BC respectively, such that $EF \parallel AB$. Show that $\frac{AE}{ED} = \frac{BF}{FC}$. **Ex. 4.2-6**

5. $P$and Q are the mid-points of the sides CA and CB respectively of a ΔABC, right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$. **Eg, 4.21**
6. Basic Proportionality Theorem (BPT) or Thales theorem **(Theo.1)**
7. Angle Bisector Theorem (ABT) **(Theo.3)**
8. Pythagoras Theorem **(Theo.5)**
9. Show that in a triangle, the medians are concurrent. **Eg. 4.32**
10. Show that the angle bisectors of a triangle are concurrent. **Ex. 4.4-9**

5 - COORDINATE GEOMETRY

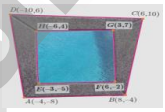
2 Marks

1. Find the area of the triangle whose vertices are $(-3,5), (5,6)$and $(5,-2)$. **Eg.5.1**
2. Show that the points $P(-1.5,3)$, $Q(6,-2)$, $R(-3,4)$ are collinear. **Eg 5.2**
3. If the area of the triangle formed by the vertices $A(-1,2), B(k,-2)$,and
4. $C(7,4)$ (taken in order) is 22 sq. units, find the value of k. **Eg. 5.3**
5. If the points $P(-1,-4), Q(b,c)$ and $R(5,-1)$are collinear and if $2b + c = 4$,then find the values of b and c. **Ege 5.4**
6. In each of the following, find the value of *'a'* for which the given points are collinear. i) $(2,3), (4,a)$ and $(6,-3)$ **Ex. 5.1-4**
7. (i) What is the slope of a line whose inclination is 30°? (ii)What is the inclination of a line whose slope is **Eg, 5. 8**:
8. Find the slope of a line joining the given points (i)$(-6,1)$ and $(-3,2)$ **Eg. 5. 9**
9. The line r passes through the points $(-2,2)$ and $(5,8)$ and the line $s$passes through the points $(-8,7)$ and $(-2,0)$. Is the line r perpendicular to s? **Eg. 5.10**
10. The line p passes through the points $(3,-2), (12,4)$ and the line q passes through the points $(6,-2)$ and $(12,2)$. Is p parallel to q? **Eg.5.11**
11. What is the inclination of a line whose slope is(i) 0 (ii) 1 **Ex. 5.2-2**
12. Find the slope of a line joining the points
    $(i)(5,\sqrt{5})$ with the origin $(ii)(\sin\theta, -\cos\theta)$ and $(-\sin\theta, \cos\theta)$ **Ex. 5.2-3**
13. The line through the points $(-2,a)$ and $(9,3)$ has slope $-\frac{1}{2}$. Find the value of a. **Ex. 5.2-7**
14. The line through the points $(-2,6)$ and $(4,8)$ is perpendicular to the line through the points $(8,12)$ and $(x,24)$. Find the value of x. **Ex. 5.2-8**
15. Find the equation of the straight line passing through $(5,7)$ and is (i) parallel to X axis (ii) parallel to Y axis. **Eg.5.17**
16. Find the equation of a straight line whose (i) Slope is 5 and $y$intercept is -9 (ii) Inclination is 45° and $y$intercept is 11 **Eg 5.18**
17. Calculate the slope and y intercept of the straight line $8x - 7y + 6 = 0$. **Eg. 5.19**
18. Find the equation of a line passing through the point $(3,-4)$ and having slope $\frac{-5}{7}$. **Eg. 5.21**
19. Find the equation of a straight line passing through $(5,-3)$ and $(7,-4)$. **Eg.5.23**
20. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coordinate axes. **Eg. 5.26**
21. Find the value of 'a', if the line through $(-2,3)$ and $(8,5)$ is perpendicular to $y = ax + 2$. **Ex. 5.3-6**
22. A cat is located at the point$(-6,-4)$ in xy plane. A bottle of milk is kept at $(5,11)$. The cat wishes to consume the milk travelling through shortest possible distance. Find the equation of the path it needs to take its milk. **Ex. 5.3-8**
23. Find the slope of the straight line $6x + 8y + 7 = 0$. **Eg. 5.30**

24. Find the slope of the line which is i) parallel to $3x - 7y = 11 (ii)$ Perpendicular to $2x - 3y + 8 = 0$. **Eg. 5.31**
25. Show that the straight lines $2x + 3y - 8 = 0$ and $4x + 6y + 18 = 0$ are parallel. **Eg. 5.32**
26. Show that the straight lines $x - 2y + 3 = 0$ and $6x + 3y + 8 = 0$ are perpendicular. **Eg 5.33**
27. Find the equation of a straight line which is parallel to the line $3x - 7y = 12$ and passing through the point $(6,4)$. **Eg. 5.34**
28. Find the equation of a straight line perpendicular to the line $y = \frac{4}{3}x - 7$ and passing through the point $(7, -1)$. **Eg. 5.35**
29. If the straight lines $12y = -(p + 3)x + 12, 12x - 7y = 16$ are perpendicular then find *'p'*. **Ex. 5.4-4**

5 Marks

1. The floor of a hall is covered with identical tiles which are in the shapes of triangles. One such triangle has the vertices at $(-3,2), (-1, -1)$and $(1,2)$. If the floor of the hall is completely covered by 110 tiles, find the area of the floor. **Eg. 5.5**
2. Find the area of the quadrilateral formed by the points $(8,6), (5,11), (-5,12)$ and $(-4,3)$. **Eg. 5.6**
3. Find the area of the quadrilateral whose vertices are at (i) $(-9, -2), (-8, -4), (2, 2)$ and $(1, -3)$ (ii) $(-9, 0), (-8, 6), (-1, -2)$ and $(-6, -3)$ **Ex. 5.1- 5**
4. Find the value of k, if the area of a quadrilateral is 28 sq.units, whose vertices are $(-4, -2), (-3, k), (3, -2)$ and $(2, 3)$ **Ex. 5.1- 6**
5. If points $A(-3,9), B(a, b)$ and $C(4, -5)$ are collinear and if $a + b = 1$, then find a and b. **Ex. 5.1- 7**
6. 9. In the figure, the quadrilateral swimming pool shown is surrounded by concrete patio. Find the area of the patio. **Ex. 5.1- 9**



7. A triangular shaped glass with vertices at $A(-5, -4), B(1,6)$ and $C(7, -4)$ has to be painted. If one bucket of paint covers 6 square feets, how many buckets of paint will be required to paint the whole glass, if only one coat of paint is applied. **Ex. 5.1- 10**
8. Without using Pythagoras theorem, show that the vertices $(1, -4), (2, -3)$ and $(4, -7)$ form a right angled triangle. **Eg. 5.15**
9. Prove analytically that the line segment joining the mid-points of two sides of a triangle is parallel to the third side and is equal to half of its length. **Eg 5.16**
10. Show that the given vertices form a right angled triangle and check whether its satisfies Pythagorastheorem (i) $A(1, -4), B(2, -3)$ and $C(4, -7)$ (ii) $L(0,5), M(9,12)$ and $N(3,14)$. **Ex. 5.2-9**
11. Show that the given points form a parallelogram: $A(2.5, 3.5), B(10, -4), C(2.5, -2.5)$ and $D(-5,5)$. **Ex. 5.2-10**
12. If the points $A(2,2), B(-2, -3), C(1, -3)$and $D(x, y)$ form a parallelogram then find the value of $x$and y. **Ex. 5.2-11**
13. Let $A(3, -4), B(9, -4), C(5, -7)$ and $D(7, -7)$. Show that $ABCD$ is a trapezium. **Ex. 5.2-12**
14. A quadrilateral has vertices $A(-4, -2), B(5, -1), C(6,5)$ and $D(-7,6)$. Show that the mid-points of its sides form a parallelogram. **Ex. 5.2-13**
15. Find the equation of a line passing through the point $A(1,4)$ and perpendicular to the line joining points $(2,5)$ and $(4,7)$. **Eg. 5.22**
16. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through $(-3,8)$. Find its equation. **Eg. 5.28**
17. If the vertices of a ΔABC $A(6,2), B(-5, -1)$ and $C(1,9)$. i) Find the equation of median ii) Find the equation of attitude **Ex. 5.3-9**
18. You are downloading a song. The percent y (in decimal form) of mega bytes remaining to get downloaded in x seconds is given by $y = -0.1x + 1$. i)Find the total MB of the song. (ii) After how many seconds will 75% of the song gets downloaded?

(iii) After how many seconds the song will be downloaded completely? **Ex. 5.3-11**

19. Find the equation of a straight line parallel to Yaxis and passing through the point of intersection of the lines $4x + 5y = 13$ and $x - 8y + 9 = 0$. **Eg. 5.36**
20. $A(-3,0)$, $B(10,-2)$ and $C(12,3)$ are the vertices of ΔABC . Find the equation of the altitude through A and B. **Ex. 5.4-7**
21. Find the equation of the perpendicular bisector of the line joining the points $A(-4,2)$ and $B(6,-4)$. **Ex. 5.4-8**
22. Find the equation of a straight line through the intersection of lines $7x + 3y = 10, 5x - 4y = 1$ and parallel to the line $13x + 5y + 12 = 0$. **Ex. 5.4-9**
23. Find the equation of a straight line through the intersection of lines $5x - 6y = 2, 3x + 2y = 10$ and perpendicular to the line $4x - 7y + 13 = 0$. **Ex. 5.4-10**
24. Find the equation of a straight line joining the point of intersection of $3x + y + 2 = 0$ and $x - 2y - 4 = 0$ to the point of intersection of $7x - 3y = -12$ and $2y = x + 3$. **Ex. 5.4-11**
25. Find the equation of a straight line through the point of intersection of the lines $8x + 3y = 18, 4x + \quad 5y = 9$ and bisecting the line segment joining the points $(5,-4)$ and $(-7,6)$. **Ex. 5.4-12**
26. Without using distance formula, show that points $(-2,-1)$, $(4,0)$, $(3,3)$ and$(-3,2)$ are the vertices of a parallelogram**.Unit Ex. 5**
27. Find the equation of a line passing through the point of intersection of the lines $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axes **Unit Ex. 9**

6 – TRIGONOMETRY

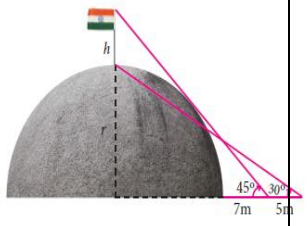
2 Marks

1. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$. **Eg. 6.1**
2. Prove that $\frac{\sin A}{1+\cos A} = \frac{1-\cos A}{\sin A}$. **Eg. 6.2**
3. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$. **Eg.6.4**
4. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$ **Eg. 6.5**
5. Prove that $(\operatorname{cosec}\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta) = 1$. **Eg. 6.9**
6. Prove that $\frac{\sin A}{1+\cos A} + \frac{\sin A}{1-\cos A} = 2\operatorname{cosec} A$ **Eg 6.10**
7. Prove the following identities. $(i)\ \cot\theta + \tan\theta = \sec\theta \operatorname{cosec}\theta$ **Ex. 6.1-1**
8. Prove the following identities. $(i)\ \frac{1-\tan^2\theta}{\cot^2\theta - 1} = \tan^2\theta$ $(ii)\ \frac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$ **Ex. 6.1-2**
9. Prove the following identities. $(i)\ \sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$ $(ii)\ \sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$ **Ex. 6.1-3**
10. A tower stands vertically on the ground. From a point on the ground, which is $48\ m$ away from the foot of the tower, the angle of elevation of the top of the tower is $30°$. Find the height of the tower. **Eg 6.19**
11. A kite is flying at a height of $75\ m$ above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is $60°$. . Find the length of the string, assuming that there is no slack in the string. **Eg. 6.20**
12. Find the angle of elevation of the top of a tower from a point on the ground, which is $30\ m$ away from the foot of a tower of height $10\sqrt{3}\ m$. **Ex. 6.2-1**
13. A player sitting on the top of a tower of height $20\ m$ observes the angle of depression of a ball lying on the ground as $60°$. Find the distance between the foot of the tower and the ball. $(\sqrt{3} = 1.732)$. **Eg. 6. 26**

14. The horizontal distance between two buildings is $140\ m$. The angle of depression of the top of the first building when seen from the top of the second building is $30°$. If the height of the first building is $60\ m$, find the height of the second building. $(\sqrt{3} = 1.732)$. **Eg. 6.27**
15. From the top of a rock $50\sqrt{3}\ m$ high, the angle of depression of a car on the ground is observed to be $30°$. Find the distance of the car from the rock. **Ex. 6.3-1**
16. The horizontal distance between two buildings is $70\ m$. The angle of depression of the top of the first building when seen from the top of the second building is $45°$. If the height of the second building is $120\ m$, find the height of the first building. **Ex. 6.3-2**

5 Marks

1. If $\operatorname{cosec}\theta + \cot\theta = P$, then prove that $\cos\theta = \frac{P^2-1}{P^2+1}$. **Eg. 6.11**
2. Prove that $\frac{\sin A}{\sec A+\tan A-1} + \frac{\cos A}{\operatorname{cosec} A+\cot A-1} = 1$. **Eg. 6.14**
3. If $\frac{\cos^2\theta}{\sin\theta} = p$ and $\frac{\sin^2\theta}{\cos\theta} = q$, then prove that $p^2q^2(p^2+q^2+3) = 1$. **Eg. 6.17**
4. Prove the following identities. (ii) $\frac{\cot\theta-\cos\theta}{\cot\theta+\cos\theta} = \frac{\operatorname{cosec}\theta-1}{\operatorname{cosec}\theta+1}$ **Ex. 6.1-5**
5. (i) If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$.
   (ii) If $\sqrt{3}\sin\theta - \cos\theta = 0$ then show that $\tan 3\theta = \frac{3\tan\theta-\tan^3\theta}{1-3\tan^2\theta}$ **Ex. 6.1-7**
6. (i) If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$, then prove that $(m^2+n^2)\cos^2\beta = n^2$.
   (ii) If $\cot\theta + \tan\theta = x$ and $\sec\theta - \cos\theta = y$, then prove that $(x^2y)^{\frac{2}{3}} - (xy^2)^{\frac{2}{3}} = 1$. **Ex. 6.1-8**
7. If $\frac{\cos\theta}{1+\sin\theta} = \frac{1}{a}$, then prove that $\frac{a^2-1}{a^2+1} = \sin\theta$. **Ex. 6.1-10**
8. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are $30°$ and $45°$ respectively. If the lighthouse is $200\ m$ high, find the distance between the two ships. $(\sqrt{3} = 1.732)$. **Eg.6.21**
9. From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a $30\ m$ high building are $45°$ and $60°$ respectively. Find the height of the tower. $(\sqrt{3} = 1.732)$. **Eg. 6.22**
10. To a man standing outside his house, the angles of elevation of the top and bottom of a window are $60°$ and $45°$ respectively. If the height of the man is $180\ cm$ and if he is $5\ m$ away from the wall, what is the height of the window? $(\sqrt{3} = 1.732)$. **Ex. 6.2-3**
11. A flag pole of height 'h' metres is on the top of the hemispherical dome of radius 'r' metres. A man is standing $7\ m$ away from the dome. Seeing the top of the pole at an angle $45°$ and moving $5\ m$ away from the dome and seeing the bottom of the pole at an angle $30°$. Find (i) the height of the pole (ii) radius of the dome. $(\sqrt{3} = 1.732)$. **Ex. 6.2-5**



12. 6. The top of a $15\ m$ high tower makes an angle of elevation of $60°$ with the bottom of an electronic pole and angle of elevation of $30°$ with the top of the pole. What is the height of the electric pole? **Ex. 6.2-6**
13. From the top of a tower $50\ m$ high, the angles of depression of the top and bottom of a tree are observed to be $30°$ and $45°$ respectively. Find the height of the tree. $(\sqrt{3} = 1.732)$. **Eg. 6.28**
14. A man is watching a boat speeding away from the top of a tower. The boat makes an angle of depression of $60°$ with the man's eye when at a distance of $200\ m$ from the tower. After 10 seconds, the angle of depression becomes $45°$. What is the approximate speed of the boat $(in\ km\ /\ hr)$, assuming that it is sailing in still water? $(\sqrt{3} = 1.732)$. **Eg. 6.30:**

15. 4. An aeroplane at an altitude of $1800\ m$ finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are $60°$ and $30°$ respectively. Find the distance between the two boats. $(\sqrt{3} = 1.732)$. **Ex. 6.3-4**
16. 5. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be $30°$ and $60°$. If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}\ m$.
17. 6. A lift in a building of height $90\ feet$ with transparent glass walls is descending from the top of the building. At the top of the building, the angle of depression to a fountain in the garden is $60°$. Two minutes later, the angle of depression reduces to $30°$. If the fountain is $30\sqrt{3}$ feet from the entrance of the lift, find the speed of the lift which is descending. **Ex. 6.3-6**
18. From the top of a $12\ m$ high building, the angle of elevation of the top of a cable tower is $60°$ and the angle of depression of its foot is $30°$. Determine the height of the tower. **Eg 6.31**
19. A pole $5\ m$ high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point *'A'* on the ground is $60°$ and the angle of depression to the point *'A'* from the top of the tower is $45°$. Find the height of the tower. $(\sqrt{3} = 1.732)$. **Eg 6.32**
20. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ_1 and θ_2 respectively. Show that the height of the opposite house is $h\left(1 + \frac{\cot\theta_2}{\cot\theta_1}\right)$. **Eg 6.33**
21. From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree. $(\sqrt{3} = 1.732)$. **Ex.6.4-1**
22. A man is standing on the deck of a ship, which is $40\ m$ above water level. He observes the angle of elevation of the top of a hill as $60°$ and the angle of depression of the base of the hill as $30°$. Calculate the distance of the hill from the ship and the height of the hill. $(\sqrt{3} = 1.732)$. **Ex.6.4-2**
23. If the angle of elevation of a cloud from a point *'h'* metres above a lake is θ_1 and the angle of depression of its reflection in the lake is θ_2. Prove that the height that the cloud is located from the ground is $\frac{h(\tan\theta_1+\tan\theta_2)}{\tan\theta_2-\tan\theta_1}$. **Ex.6.4-3**
24. The angle of elevation of the top of a cell phone tower from the foot of a high apartment is $60°$ and the angle of depression of the foot of the tower from the top of the apartment is $30°$. If the height of the apartment is $50\ m$, find the height of the cell phone tower. According to radiations control norms, the minimum height of a cell phone tower should be $120\ m$. State if the height of the above mentioned cell phone tower meets the radiation norms. **Ex.6.4-4**
25. The angles of elevation and depression of the top and bottom of a lamp post from the top of a $66\ m$ high apartment are $60°$ and $30°$ respectively. Find (i) The height of the lamp post. (ii) The difference between height of the lamp post and the apartment. (iii) The distance between the lamp post and the apartment. $(\sqrt{3} = 1.732)$. **Ex.6.4-5**
26. Two ships are sailing in the sea on either side of the lighthouse. The angles of depression of two ships as observed from the top of the lighthouse are $60°$ and $45°$ respectively. If the distance between the ships is $200\left(\frac{\sqrt{3}+1}{\sqrt{3}}\right)$ metres, find the height of the lighthouse. **Unit Ex.8**

7 – MENSURATION
2 Marks

1. A cylindrical drum has a height of $20\ cm$ and base radius of $14\ cm$. Find its curved surface area and the total surface area. **Eg.7.1**
2. The curved surface area of a right circular cylinder of height $14\ cm$ is $88\ cm^2$. Find the diameter of the cylinder. **Eg.7.2**

3. A garden roller whose length is 3 m long and whose diameter is 2.8 m is rolled to level a garden. How much area will it cover in 8 revolutions? **Eg. 7.3**
4. If one litre of paint covers 10 m^2, how many litres of paint is required to paint the internal and external surface areas of a cylindrical tunnel whose thickness is 2 m, internal radius is 6 m and height is 25 m. **Eg.7.4**
5. The radius of a conical tent is 7 m and the height is 24 m. Calculate the length of the canvas used to make the tent if the width of the rectangular canvas is 4 m? **Eg. 7. 5**
6. If the total surface area of a cone of radius $7cm$ is 704 cm^2, then find its slant height. **Eg. 7.6**
7. Find the diameter of a sphere whose surface area is 154 m^2. **Eg. 7.8**
8. The radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases. **Eg. 7.9**
9. If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area? **Eg. 7.10**
10. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area. **Eg. 7.13**
11. The radius and height of a cylinder are in the ratio $5:7$and its curved surface area is 5500 $sq.cm$. Find its radius and height. **Ex. 7.1-1**
12. The external radius and the length of a hollow wooden log are 16 cm and 13 cm respectively. If its thickness is 4 cm then find its $T.S.A$. **Ex. 7.1-3**
13. The ratio of the radii of two right circular cones of same height is $1:3$. Find the ratio of their curved surface area when the height of each cone is 3 times the radius of the smaller cone. **Ex. 7.1-7**
14. The radius of a sphere increases by 25%. Find the percentage increase in its surface area. **Ex. 7.1-8**
15. Find the volume of a cylinder whose height is 2 m and whose base area is 250 m^2. **Eg. 7.15**
16. Find the volume of the iron used to make a hollow cylinder of height 9 cm and whose internal and external radii are 21 cm and 28 cm respectively. **Eg. 7.17**
17. The volume of a solid right circular cone is 11088 cm^3. If its height is 24 cm then find the radius of the cone. **Eg.7.19**
18. The ratio of the volumes of two cones is $2:3$. Find the ratio of their radii if the height of second cone is double the height of the first. **Eg.7.20**

2 Marks

1. A 14 m deep well with inner diameter 10 m is dug and the earth taken out is evenly spread all around the well to form an embankment of width 5 m. Find the height of the embankment. **Ex. 7.2-1**
2. A cylindrical glass with diameter 20 cm has water to a height of 9 cm. A small cylindrical metal of radius 5 cm and height 4 cm is immersed it completely. Calculate the raise of the water in the glass? **Ex. 7.2-2**
3. A conical container is fully filled with petrol. The radius is $10m$ and the height is 15 m.If the container can release the petrol through its bottom at the rate of 25 $cu.meter$ per minute, in how many minutes the container will be emptied. Round off your answer to the nearest minute. **Ex. 7.2-4**
4. A right angled triangle whose sides are 6 cm, 8 cm and 10 cm is revolved about the sides containing the right angle in two ways. Find the difference in volumes of the two solids so formed. **Ex. 7.2-5**
5. A container open at the top is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of milk which can completely fill a container at the rate of ₹ 40per litre. **Ex. 7.2-10**
6. Arul has to make arrangements for the accommodation of 150persons for his family function. For this purpose, he plans to build a tent which is in the shape of cylinder surmounted by a cone. Each person occupies 4 $sq.m$ of the space on ground and 40 $cu.meter$ of air to breathe. What should be the height of the conical part of the tent if the height of cylindrical part is 8 m? **Eg.7.26**

7. A funnel consists of a frustum of a cone attached to a cylindrical portion 12 cm long attached at the bottom. If the total height be 20 cm, diameter of the cylindrical portion be 12 cm and the diameter of the top of the funnel be 24 cm.Find the outer surface area of the funnel. **Eg.7.27**
8. A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter is 14 cm and the height of the vessel is 13 cm. Find the capacity of the vessel. **Ex. 7.3-1**
9. Nathan, an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3 cm and its length is 12 cm.If each cone has a height of 2 cm, find the volume of the model that Nathan made **Ex. 7.3-2**
10. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold? **Ex. 7.3-**
11. A metallic sphere of radius 16 cm is melted and recast into small spheres each of radius 2 cm. How many small spheres can be obtained? **Eg.7.29**
12. A cone of height 24 cm is made up of modeling clay. A child reshapes it in the form of a cylinder of same radius as cone. Find the height of the cylinder. **Eg. 7.30**
13. A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container. **Eg. 7.31**
14. An aluminium sphere of radius 12 cm is melted to make a cylinder of radius 8 cm. Find the height of the cylinder. **Ex. 7.4-1**
15. Water is flowing at the rate of 15 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tanks will rise by 21 cm. **Ex. 7.4-2**
16. A conical flask is full of water. The flask has base radius r units and height h units, the water poured into a cylindrical flask of base radius xr units. Find the height of water in the cylindrical flask. **Ex. 7.4-3**
17. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter. **Ex. 7.4-4**
18. Seenu's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from sump (underground tank) which is in the shape of a cuboid. The sump has dimensions $2\ m \times 1.5\ m \times 1\ m$. The overhead tank has its radius of 60 cm and height 105 cm. Find the volume of the water left in the sump after the overhead tank has been completely filled with water from the sump which has been full, initially. **Ex. 7.4-5**The internal and external diameter of a hollow hemispherical shell are 6cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, then find the height of the cylinder. **Ex. 7.4-6**
19. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, then find the thickness of the cylinder. **Ex. 7.4-7**
20. A hemispherical bowl is filled to the brim with juice. The juice is poured into a cylindrical vessel whose radius is 50% more than its height. If the diameter is same for both the bowl and the cylinder then find the percentage of juice that can be transferred from the bowl into the cylindrical vessel. **Ex. 7.4-8**

8 - STATISTICS AND PROBABILITY

2 Marks

1. Find the range and coefficient of range of the following data: $25, 67, 48, 53, 18, 39, 44$. **Eg. 8.1**
2. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value. **Eg. 8.3**

3. 1. Find the range and coefficient of range of $(i)\ 63, 89, 98, 125, 79, 108, 117, 68$ **Ex. 8.1-1**

4. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value. **Ex. 8.1-2**
5. Find the standard deviation of first 21 natural numbers. **Ex. 8.1-7**
6. If the standard deviation of a data is 4.5 and if each value of the data is decreased by 5, then find the new standard deviation. **Ex. 8.1-8**
7. If the standard deviation of a data is 3.6 and each value of the data is divided by 3, then find the new variance and new standard deviation. **Ex. 8.1-9**
8. The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation. **Eg. 8.15**
9. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation. **Ex. 8.2-1**
10. The standard deviation and coefficient of variation of a data are 1.2 and 25.6 respectively. Find the value of mean. **Ex. 8.2-2**
11. If the mean and coefficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation. **Ex. 8.2-3**
12. If $n = 5\ , \bar{x} = 6\ , \sum x^2 = 765$, then calculate the coefficient of variation. **Ex. 8.2-4**
13. A bag contains 5 blue balls and 4 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) blue (ii) not blue. **Eg. 8.18:**
14. Two dice are rolled. Find the probability that the sum of outcomes is (i) equal to 4 (ii) greater than 10 (iii) less than 13 **Eg. 8.19**
15. Two coins are tossed together. What is the probability of getting different faces on the coins? **Eg.8.20:**
16. What is the probability that a leap year selected at random will contain 53 saturdays. $(Hint: 366 = 52 \times 7 + 2)$. **Eg. 8.21.**
17. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head. **Eg. 8.22**
18. 3. If A is an event of a random experiment such that $P(A) : P(\bar{A}) = 17 : 15$ and $n(S) = 640$ then find $(i)\ P(\bar{A})\ (ii)\ n(A)$. **Ex.8.3-3**
19. 4. A coin is tossed thrice. What is the probability of getting two consecutive tails? **Ex.8.3-4**
20. If $P(A) = 0.37\ , P(B) = 0.42\ , P(A \cap B) = 0.09$ then find $P(A \cup B)$. **Eg. 8.25**
21. If A and B are two events such that $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{2}$ and $P(A\ and\ B) = \frac{1}{8}$, find $(i)\ P(A\ or\ B)$ $(ii)\ P(not\ A\ and\ not\ B)$. **Eg. 8.28**
22. If $P(A) = \frac{2}{3}\ , P(B) = \frac{2}{5}, P(A \cup B) = \frac{1}{3}$ then find $P(A \cap B)$. **Ex. 8.4-1**
23. A and B are two events such that, $P(A) = 0.42,\ P(B) = 0.48$ and $P(A \cap B) = 0.16$. Find $(i) P(notA)$ $(ii) P(not\ B)$ $(iii)\ P(A\ or\ B)$ **Ex. 8.4-2**
24. If A and B are two mutually exclusive events of a random experiment and $P(notA) = 0.45, P(A \cup B) = 0.65$, then find $P(B)$. **Ex. 8.4-.3**
25. The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutuall exclusive events, then find the probability that neither A nor B happen. **Ex. 8.4-5**

5 marks:

1. The number of televisions sold in each day of a week are $13, 8, 4, 9, 7, 12, 10$. Find its standard deviation. **Eg. 8.4**
2. The marks scored by 10 students in a class test are $25, 29, 30, 33, 35, 37, 38, 40, 44, 48$. Find the standard deviation. **Eg. 8.6**
3. The amount that the children have spent for purchasing some eatables in one day trip of a school are $5, 10, 15, 20, 25, 30, 35, 40$. Using step deviation method, find the standard deviation of the amount they have spent. **Eg. 8.7**

4. Find the mean and variance of the first n natural numbers. **Eg.8.10**
5. 48 students were asked to write the total number of hours per week they spent on watching television. With this information find the standard deviation of hours spent for watching television. **Eg. 8.11**

x	6	7	8	9	10	11	12
f	3	6	9	13	8	5	4

6. For a group of 100 candidates the mean and standard deviation of their marks were found to be 60 and 15 respectively. Later on it was found that the scores 45 and 72 were wrongly entered as 40 and 27. Find the correct mean and standard deviation. **Ex.8.1-14**
7. Find the coefficient of variation of $24, 26, 33, 37, 29, 31$. **Ex. 8.2-5**
8. The time taken $(in\ minutes)$ to complete a homework by 8 students in a day are given by $38, 40, 47, 44, 46, 43, 49, 53$. Find the coefficient of variation. . **Ex. 8.2-6**
9. The total marks scored by two students Sathya and Vidhya in 5 subjects are 460 and 480 with standard deviation 4.6 and 2.4 respectively. Who is more consistent in performance? . **Ex. 8.2-7**
10. A bag contains 12 blue balls and x red balls. If one ball is drawn at random (i) what is the probability that it will be a red ball? (ii) If 8 more red balls are put in the bag, and if the probability of drawing a red ball will be twice that of the probability in (i), then find x. **Ex. 8.3-6**
11. Two unbiased dice are rolled once. Find the probability of getting
    (i) a doublet (equal numbers on both dice) (ii) the product as a prime number
    (iii) the sum as a prime number (iv) the sum as 1 **Ex. 8.3-7**
12. Three fair coins are tossed together. Find the probability of getting
    (i) all heads (ii) atleast one tail (iii) atmost one head (iv) atmost two tails **Ex. 8.3-8**
13. A bag contains 5 red balls, 6 white balls, 7 green balls, 8 black balls. One ball is drawn at random from the bag. Find the probability that the ball drawn is (i) white (ii) black or red (iii) not white (iv) neither white nor black. **Ex. 8.3-9**
14. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4. **Eg. 8.27**
15. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that (i) The student opted for NCC but not NSS. (ii) The student opted for NSS but not NCC. (iii) The student opted for exactly one of them. **Eg. 8.30**
16. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 8. **Ex. 8.4-6**
17. Three unbiased coins are tossed once. Find the probability of getting atmost 2 tails or atleast 2 heads. **Ex. 8.4-8**
18. The probability that a person will get an electrification contract is $\frac{3}{5}$ and the probability that he will not get plumbing contract is $\frac{5}{8}$. The probability of getting atleast one contract is $\frac{5}{7}$. What is the probability that he will get both? **Ex. 8.4-9**
19. A coin is tossed thrice. Find the probability of getting exactly two heads or atleast one tail or consecutive two heads. **Ex. 8.4-11**
20. If A, B, C are any three events such that probability of B is twice as that of probability of A and probability of C is thrice as that of probability of A and if $P(A \cap B) = \frac{1}{6}, P(B \cap C) = \frac{1}{4}, P(C \cap A)\ \frac{1}{8}, P(A \cup B \cup C) = \frac{9}{10}, P(A \cap B \cap C) = \frac{1}{15}$, then find $P(A), P(B)$ and $P(C)$? **Ex. 8.4-12**

8 marks (Geometry)

TYPE - I

1. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR(scale factor $\frac{3}{5} < 1$). **Eg 4. 10**
2. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$). **Eg. 4.11**
3. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{2}{3} < 1$) **Ex. 4.1-10**
4. Construct a triangle similar to a given triangle LMN with its sides equal to $\frac{4}{5}$ of the corresponding sides of the triangle LMN (scale factor $\frac{4}{5} < 1$) **Ex. 4.1-11**
5. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC (scale factor $\frac{6}{5} > 1$). **Ex. 4.1-12**
6. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$). **Ex. 4.1-13**

TYPE - II

1. Construct a ΔPQR in which $PQ = 8\ cm,\ \angle R = 60°$ and the median RG from $R$to PQ is 5.8 cm. Find the length of the altitude from R to PQ. **Eg. 4.17**
2. Construct a triangle ΔPQR such that $QR = 5\ cm, P = 30°$ and the altitude from $P$to $QR$is of length 4.2 cm. **Eg. 4.18**:
3. Draw a triangle ABC of base $BC = 8\ cm, \angle A = 60°$ and the bisector of $\angle A$ meets BC at Dsuch that $BD = 6\ cm$. **Eg. 4.19**
4. Construct a ΔPQR which the base $PQ = 4.5\ cm, \angle R = 35°$ and the median from R to RG is 6 cm. **Ex.4.2-11**
5. Construct a ΔPQR in which $QR = 5\ cm, \angle P = 40°$ and the median PG from P to QR is 4.4 cm. Find the length of the altitude from P to QR. **Ex.4.2-12**
6. Construct a ΔPQR such that $QR = 6.5\ cm, \angle P = 60°$ and the altitude from P to QR is of length 4.5 cm. **Ex.4.2-13**
7. Construct a ΔABC such that $AB = 5.5\ cm, \angle C = 25°$ and the altitude from C to AB is 4 cm. **Ex.4.2-14**
8. Draw a triangle ABC of base $BC = 5.6\ cm, \angle A = 40°$ and the bisector of $\angle A$ meets BC at D such that $CD = 4\ cm$. **Ex.4.2-15**
9. Draw ΔPQR such that $PQ = 6.8\ cm$, vertical angle is 50° and the bisector of the vertical angle meets the base at D where $PD = 5.2\ cm$. **Ex.4.2-16**
10. Draw a circle of radius 3 cm. Take a point P on this circle and draw a tangent at P. **Eg.4.29**
11. Draw a circle of radius 4 cm. At a point L on it draw a tangent to the circle using the alternate segment. **Eg. 4.30**
12. Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths. **Eg.4.31**

TYPE - III

1. Draw a tangent at any point R on the circle of radius 3.4 cm and centre at P? **Ex. 4.4-11**
2. Draw a circle of radius 4.5 cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem. **Ex. 4.4-12**
3. Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents. **Ex. 4.4-13**

4. Take a point which is 11 *cm* away from the centre of a circle of radius 4 *cm* and draw the two tangents to the circle from that point. **Ex. 4.4-14**
5. Draw the two tangents from a point which is 5 *cm* away from the centre of a circle of diameter 6 *cm.* Also, measure the lengths of the tangents. **Ex. 4.4-15**
6. Draw a tangent to the circle from the point *P*having radius 3.6 *cm,* and centre at *O*.Point *P* is at a **Ex. 4.4-16**

8 Marks (Graph)

TYPE – I

1. Varshika drew 6 circles with different sizes. Draw a graph for the relationship between the diameter and circumference of each circle as shown in the table and use it to find the circumference of a circle when its diameter is 6 cm. **Eg, 3.47.**

Diameter (x) cm	1	2	3	4	5
Circumference (y) cm	3.1	6.2	9.3	12.4	15.5

3. A bus is travelling at a uniform speed of 50km/hr. Draw the distance time graph and hence find
   (i) the constant of variation (ii) how far will it travel in 90 mins
   (iii) the time required to cover a distance of 300 km from the graph. **Eg. 3.48**
4. A company initially started with 40 workers to complete the work by 150 days. Later, it decided to fasten up the work increasing the number of workers as shown below. **Eg.3.49**

Number of workers(x)	40	50	60	75
Number of days(y)	150	120	100	80

   (i) Graph the above data and identify the type of variation.
   (ii) From the graph, find the number of days required to complete the work if the company
   (iii)If the work has to be completed by 30 days, how many workers are required?
5. Nishanth is the winner in a Marathon race of 12km distance. He ran at the uniform speed of 12km/hr and reached the destination in 1 hour. He was followed by Aradhana, Ponmozhi, Jeyanthi,Sathya and Swetha with their respective speed of 6km/hr, 4km/hr, 3km/hr and 2km/hr. And, they covered the distance in 2hrs, 3hrs,4hrs and 6 hours respectively. Draw the speed-time graph and use it to find the time taken to Kaushik with his speed of 2.4km/hr. **Eg. 3.50**
6. A garment shop announces a flat 50% discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount Hence find.
   (i) the marked price when a customer gets a discount of ₹. 3250(from graph)
   (ii) the discount when the marked price is ₹.2500 **Ex. 3.15-1.**
7. Draw the graph of xy=24,x,y>0. Using the graph find (i) y when x=3 and (ii) x when y=6. **Ex. 3.15-2.**
8. Graph the following linear function $y=\frac{1}{2}x$. Identify the constant of variation and verify it with the graph Also(i) find y when x=9 (ii)find x when y= 7.5. **Ex. 3.15-3**
9. The following table shows the data about the number of pipes and the time taken to till the same tank.

No of pipes(x)	2	3	6	9
Time taken (in min)(y)	45	30	15	10

   Draw the graph for the above data and hence
   (i) find the time taken to fill the tank when five pipes are used
   (ii) Find the number of pipes when the times in 9 minutes. **Ex. 3.15-4**
10. A school announces that for a certain competitions, the cash price will be distributed for all the participants equally as show below

11.

No of participants(x)	2	4	6	8	10

Amount for each participant in (₹) (y)	180	90	60	45	36

(i) Find the constant of variation. (ii) Graph the above data and hence find how much will each participant get if the number of participants are 12. **Ex. 3.15-5**

12. A two wheeler parking zone near bus stand charges as below.

Time (in hours) (x)	4	8	12	24	
Amount (y) (₹)	60	120	180	360	**Ex. 3.15-6.**

13. Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also (i) find the amount to be paid when parking time time is 6 hr;(ii) find the parking duration when the amount paid is Rs.150.

TYPE - II

1. Discuss the nature of solutions of the following quadratic equations.
   $(i)x^2 + x - 12 = 0$ $(ii)x^2 - 8x + 16 = 0$ $(iii)x^2 + 2x + 5 = 0$ **Eg. 3.51**
2. Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$. **Eg. 3.52**
3. Draw the graph of $y = x^2 + 4x + 3$ and hence find the roots of $x^2 + x + 1 = 0$. **Eg. 3.53**
4. Draw the graph of $y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$. **Eg. 3.54**
5. Draw the graph of$y = x^2 - 4x + 3$ and use it to solve$x^2 - 6x + 9 = 0$. **Eg. 3.55**
6. 1. Graph the following quadratic equations and state their nature of solutions.
   $(i)x^2 - 9x + 20 = 0$ $(ii)x^2 - 4x + 4 = 0$ $(iii)x^2 + x + 7 = 0$
   $(iv)x^2 - 9 = 0(v)x^2 - 6x + 9 = 0$ $(vi)(2x - 3)(x + 2) = 0$ **Ex. 3.16-1**
7. Draw the graph of $y = x^2 - 4$and hence solve $x^2 - x - 12 = 0$. **Ex. 3.16-2**
8. Draw the graph of $y = x^2 + x$ and hence solve $x^2 + 1 = 0$. **Ex. 3.16-3**
9. Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$. **Ex. 3.16-4**
10. Draw the graph of $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$. **Ex. 3.16-5**
11. Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$. **Ex. 3.16-6**
12. Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$. **Ex. 3.16-7**
13. Draw the graph of $y = (x - 1)(x + 3)$ and hence solve $x^2 - x - 6 = 0$. **Ex. 3.16-8**