DAV PUBLIC SCHOOL, JHARSUGUDA

QUESTIONS BANK CLASS-X

I.Real Number

(1Mark)

1.The LCM of two numbers is 760 and their product is 6080. Find their HCF.

2. Is it possible for the LCM and HCF of numbers to be 378 and 18 respectively?

3. Determine the values of p and q so that the prime factorisation of 2520 is expressible as

$2^3 \times 3^p \times q \times 7$

3.Find the value of $(-1)^n + (-1)^{2n} + (-1)^{2n+1} + (-1)^{4n+1}$, where n is positive odd integer.

4. If $793800 = 2^3 \times 3^m \times 5^n \times 7^2$, find the value of m and n.

5. The decimal expansion of the rational number $\frac{43}{2^4 \times 5^3}$ will terminate after how many places of decimals?

6. Find the least prime factor of a+b if the least prime factors of a and b are 3 and 7 respectively.

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

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

9. What is the LCM of *p* and *q* where $p = a^3b^2$ and $q = b^3a^2$?

10. A number N when divided by 15 gives the remainder 4. What is the remainder when the same number is divided by 5?

11. Euclid's division lemma states that for two positive integers a and b, there exist unique integers *q* and *r* such that a = b q +r. What condition r must satisfy ?

12. After how many places of decimals will the decimal expansion of $23457/2^3 \times 5^4$ terminate?

13. State whether 6/200 has terminating or non-terminating repeating decimal expansion.

14. Find the (HCF×LCM) for the numbers 50 and 20.

(2Marks)

1. Show that any positive even integer can be written in the form of 6q,6q+2 or 6q+4 where q is an integer

2. Find the prime factorisation of the denominator of the of the rational number equivalent to 8.39.

3. If HCF(6,a) = 2 and LCM(6,a) =60 then find a.

4. Show that the numbers 143 and 187 are not coprime.

5. Determine whether the following number have a terminating decimal expansion or non-terminating repeating decimal expansion: $\frac{17}{3125}$.

6. If two positive integers x and y are expressible in terms of primes as $x = p^2 q^3$ and $y = p^3 q$, what can you say about their LCM and HCF. Is LCM a multiple of HCF ? Explain.

7. Find the least number that is divisible by all numbers between 1 and 10 (both inclusive).

8. Given that HCF (306, 657) = 9, find LCM (306, 657).

9. What type of decimal expansion will 69/60 represent? After how many Places will the decimal expansion terminate?

10. Find the H.C.F. of the smallest composite number and the smallest prime number.

11. State Euclid's Division Lemma and hence find HCF of 16 and 28.

12. State fundamental theorem of Arithmetic and hence find the unique factorisation of 120.

13. Find the HCF of 867 and 255. Using Euclid's division algorithm.

14. given that LCM (26, 169) = 338, find HCF (26,169).

15. Express 32760 as product of its prime factors using factor tree.

16. Can the numbers 6^n, n being a natural number end with the digit 5? Give reasons.

17. Find the least number that is divisible by first five even numbers.

(3Marks)

1. Show that n^2 leaves the remainder 1 when divided by 8, where n is an odd positive integer.

2. Use Euclid's division lemma show that the square of any positive integer is either of the form 5m,5m+1 or 5m+4 for some integer m.

3. If $\frac{241}{4000} = \frac{241}{2^m 5^n}$,find the values of m and n where m and n are non negative integers. Hence write its decimal expansion without actual division.

4.Prove that $3-5\sqrt{2}$ is an irrational number.

5. 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.

6. If n is an odd integer, then show that $n^n - 1$ is divisible by 8.
7. Use Euclid's division algorithm to find the HCF of 441, 567, and 693.
8. Show that 12^n cannot end with the digit 0 or 5 for any natural number n.
9. 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?
10. Prove that one of any three consecutive positive integers must be divisible by 3.
11. For any positive integer n, prove that $n^3 - n$ is divisible by 6.

12. If d is the HCF of 45 and 27, find x and y satisfying d= 27 x +45 y.

13. Pens are sold in pack of 8 and notepads are sold in pack of 12. Find the least number of packs of each type that one should buy so that there are equal number of pen and notepads

14. Find the least positive integer which on adding 1 is exactly divisible by 126 and 600

15. A boy with collection of marbles realizes that if he makes a group of 5 or 6 marbles at a time there are always two marbles left. Can you explain why the boy can't have prime numbers of marbles?

16. Show that 571 is a prime number.

17. Prove that no number of the type 4K + 2 can be a perfect square

18. Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.

19. If the HCF of 210 and 55 is expressible in the form 210 × 5 + 55y then find y.

20. If a = 4q + r then what are the conditions for a and q. What are the values that r can take?
21.. What is the smallest number by which $\sqrt{5}-\sqrt{3}$ be multiplied to make it a rational no? Also find the no. so obtained.

22. Prove that n^2-n is even for every positive integer n.

23. Prove that $6 + 10\sqrt{11}$ is an irrational number.

24. Show that $1/\sqrt{3}$ is irrational.

25.Find the greatest number of 6 digits exactly divisible by 24, 15 and 36.

26.Show that 9^n cannot end with the digit 2 for any $n \in N$.

27.Find the largest number which divides 318 and 739 leaving remainder 3 and 4 respectively.

28. Prove that $\sqrt[3]{6}$ is not a rational number.

29. Show that any positive odd integer is of the form 8q+1, 8q+3, 8q+5 or 8q+7, where q is some integer.

30. The following real numbers have decimal expansions as given below. In each case decide, whether they are rational or not. If they are rational and of the form, $\frac{p}{q}$ what can you say about the prime factor of q.

(i) 0.0875 (ii) 0.130130013000130000..... (iii) $0.\overline{142857}$

(4Marks)

1. Is square root of every non square number always irrational? Find the smallest natural number which divides 2205 to make its square root a rational number.

2. Find HCF of 378,180 and 420 by prime factorisation method. Is HCF X LCM of the three numbers equal to the product of the three numbers?

3. If n is an odd integer then show that $n^2 - 1$ is divisible by 8.

4. Show that one and only one out of n, n+2 and n+4 is divisible by 3, where n is any positive integer.

5. Prove that cube of any positive integer is of the form 4m, 4m+1 or 4m+3 for some integer m.

6. Using Euclid's division algorithm, find which of the following pairs of numbers are co-prime:
(i) 231, 396 (ii) 847, 2160

7. Show that cube of any positive integer is of the form 4m, 4m + 1 or 4m + 3, for some integer m.

8. Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m ,

9m + 1 or 9m + 8.

9. The length breadth and height of a room are 8m 25cm, 6m 75cm and 4m 50cm respectively. Determine the longest rod which can measure the three dimensions of the room exactly.

10. Show that $\sqrt{p} + \sqrt{q}$ is irrational, where *p, q* are primes.

11. Show that cube of any positive integer is of the form 4m, 4m+1 or 4m+3, for some integer m.

II. Polinomials

(1Mark)

1. Write the quadratic polynomial having zeroes 1 and –2.

2. Write the quadratic polynomial whose sum of zeroes is 3 and product of zeroes is –2.

3. If (x + 1) is a factor of $x^2 – 3ax + 3a – 7$, then find the value of a .

4. How many polynomials are there having zeroes –2 and 5.

5. Write the quadratic polynomial p(y) with –15 and –7 as sum and one of the zeroes respectively.

6. If 1 is a zero of the polynomial $p(x) = ax^2 – 3(a – 1)x – 1$, then find the value of a .

7. If – 4 is a zero of the polynomial $x^2 – x – (2 + 2k)$, then find the value of k.

8. Write the quadratic polynomial having sum and product of zeroes 1 and –2 respectively.
9. If (x + 1) is a factor of $x^2 – 3ax + 3a – 7$, then find the value of a .
10. Find the degree of the polynomial $(x + 1)(x^2 – x – x^4 + 1)$.
11. Find a quadratic polynomial, the sum and product of whose zeroes are 0 and $\sqrt{5}$ respectively.
12. Find the quadratic polynomial, the sum and product of whose zeroes are 4 and 1, respectively
13. Find the quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and 3 respectively.
14. Find the remainder when $p(x)= x^3-6x^2+2x-4$ is divided by 1 -2x.
15. Find the remainder when $x^{51}+51$ is divided by (x+1).
16. Find all the integral zeros of $x^3-3x^2-2x + 6$
17. On dividing $2x^2+ 3x + 1$ by a polynomial g(x), the quotient and the remainder were 2x+1 and 3 respectively. Find g (x).
18. Find the zeroes of $2x^3–11x^2+ 17x – 6$.
19. Find the quadratic polynomial, the sum and the product of whose zeroes are1/2, and –2 resp.
20. Find the values of m and n for which x = 2 and –3 are zeroes of the polynomial: $3x^2–2mx+ 2n$
21. Check whether $x^2+ 4$ is factor of $x^4+ 9x^2+ 20$.
22. Find the polynomial whose sum and product of the zeros are - ½ and ½ respectively.
23. Can *y* + 1 be the remainder on division of a polynomial *p*(*y*) by *y* - 5 ? Give reason.

24. If α ,β are the zeros of $f(x) = px^2 – 2x + 3p$ and α + β = α β, then find the value of *p* .

25. If one zero of the quadratic polynomial $p(x) = x^2 + 4kx - 25$ is negative of the other, find the value of k.

26. Answer the following questions in one word, one sentence or as per the exact requirement of the question.

i) If one zero of the quadratic polynomial $x^2 + x – 2$ is -2, find the other zero.

iii) Find the quadratic polynomial whose zeros are -3 and -5 .

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(2 MARKS)

1. Divide the polynomial $(x^2+ 1)$ by $(x –1)$ and verify the division algorithm.
2. If one zero of $2x^2 – 3x + k$ is reciprocal to the other, then find the value of k.

3.Find the value of p for which the polynomial $x^3 + 4x^2 – px + 8$ is exactly divisible by $(x – 2)$.

4. If 1 is a zero of the polynomial $p(x) = ax^2– 3(a – 1)x – 1$, then find the value of a .

5. If –4 is a zero of the polynomial $x^2 – x – (2 + 2k)$, then find the value of k.
6.What must be subtracted from the polynomial $8x^4 + 14x^3 +x^2 +7x + 8$ so that the resulting polynomial is exactly divisible by $4x^2 – 3x + 2$?

7.If the remainder on division of $x^3 +2x^2 + k x +3$ by x - 3 is 21. Find the quotient and the value of k.

8.If α and β are the zeros of the polynomial $f(x) = x^2 – 3x + 2$, then find the value $1/\alpha +1/\beta$.

9.If a and 1/a are the zeros of polynomial $4x^2 -2x +(k-4)$, then find the value of k.

10.Find the zeros of the polynomial $5y^2 -11y +2$.

(3 Marks)

1. Find a quadratic polynomial each with the given zeros as sum and the product of its zeros respectively (a) ¼, -1 (b) $\sqrt{2}$, 1/3

2. Using division algorithm, find the quotient and the remainder on dividing f(x) by g(x) , where

$f(x)=6x^3 +13x^2 +2x$ and $g(x)=2x+1$

3. If $x+1$ is a factor of $2x^3 + ax^3 + 2bx + 1$, then find the values of a and b given that $2a–3b = 4$.
4. If α , β are the zeros of $2y^2+7y+5$ write the value of $\alpha+ \beta +\alpha \beta$.
5. Find the zeros of a quadratic polynomial $5x^2- 4 -8x$ and verify the relationship between the zeros and the coefficients of the polynomial.

6. If α, β are the zeros of the poly. $f(x)=x^2-px+q$, find the value of
(a) $\alpha^2+\beta^2$ (b)$1/\alpha +1\beta$

7.Find all the zeros of $p(x) = x^3 – 9x^2 – 12x + 20$ if $(x+2)$ is a factor of p(x).

8.If (x + a) is a factor of two polynomials $x^2 +p x +q$ and $x^2 + mx + n$ then prove that

a = n - q / m - p .

9.Find the zeros of $4\sqrt{3}x^2 +5x - 2\sqrt{3}$ and verify the relation between the zeros and coefficient of the polynomial.

10.If a and β are the zeros of the quadratic polynomial $f(t) = t^2 – p(t +1)- c$, show that

$(\alpha+1)(\beta+1) = 1 – c$.

11. If the zeros of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then find *a* and *b*.

(4 MARKS)

1. Find all the zeros of $2x^4-9x^3+5x^2+3x-1$, if two of its zeros are $2+\sqrt{3}$ & $2-\sqrt{3}$

2.If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be (ax + b), find a and b.

3.Find all other zeroes of the polynomial $p(x) = 2x^3 + 3x^2 – 11x – 6$, if one of its zero is –3.

4. Given that $x – \sqrt{5}$ is a factor of the cubic polynomial $x^3 – 3\sqrt{5}x^2 + 13x – 3\sqrt{5}$,find all the zeroes of the polynomial
5. Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3 + \sqrt{2}x^2 – 10x – 4\sqrt{2}$, find its other two zeroes.
6. Find k so that $x^2 + 2x + k$ is a factor of $2x^4 + x^3 – 14x^2 + 5x + 6$. Also find all the zeroes of the two polynomials.
7.Obtain all other zeros of the polynomial $x^4 - 3x^3 – x^2 + 9x – 6$, if two of its zeros are $\sqrt{3}$ and $-\sqrt{3}$.

8.Find the cubic polynomial with the sum ,sum of the products of its zeroes taken two at a time, and the products of its zeroes as -3, -8 and 2 respectively.

9.Given that $\sqrt{3}$ is a zero of the polynomial $x^3 + x^2 - 3x – 3$, find its other two zeroes.

10.If the zeros of the polynomial $f(x) = x^3 - 3x^2 - 6x + 8$ are of the form a -b, a, a + b, find all the zeros.

11. If α and β are the zeros of the polynomial $f(x) = 4x^2 - 5x + 1$, find a quadratic polynomial whose zeros are α^2/β and β^2/α .

III. Pair of Linear Equations in Two Variables

(1Mark)

1. Solve $x – y = 4$, $x + y = 10$ and hence find the value of *p* when $y = 3x – p$.

3. For which value(s) of *k* will the pair of equations $kx + 3y = k – 3$; $12x + ky = k$ have no solution?
4. Find the value of *k* for which the lines $(k+1)x + 3ky + 15 = 0$ and $5x + k y + 5 = 0$ are coincident.

5. What types of lines do the pair of eqn. x = a and y = b represent graphically.

6. How many solutions does the pair of equations $x + 2y = 3$ and $\frac{1}{2}x + y - 3/2 = 0$ have?

7. Find the value of k for which the system of equations $2x + y - 3 = 0$ and $5x + k y + 7 = 0$ has no solution.

8. Find the value of k for which the system of equations $2x + 3y = 7$ and

$8x + (k+4)y – 28 = 0$ has infinitely many solution.

9. Give linear equations which is coincident with $2x + 3y - 4 = 0$

10. What is the value of a for which (3, *a*) lies on $2x – 3y = 5$.
11. The sum of two natural nos. is 25 and their difference is 7. Find the nos.

(2Marks)

1. For which values of p and q, will the following pair of linear equations have infinitely many Solutions? $4x + 5y = 2$; $(2p + 7q)\,x + (p + 8q)\,y = 2q - p + 1$.
2. Solve the following pair of linear equations: $21x + 47y = 110$; $47x + 21y = 162$
3. The angles of a cyclic quadrilateral ABCD are A = $(6x + 10)°$, B = $(5x)°$ C = $(x + y)°$, D = $(3y - 10)°$. Find x and y, and hence the values of the four angles.
4. Check graphically whether the pair of eq. $3x + 2y - 4 = 0$ and $2x - y - 2 = 0$ is consistent. Also find the coordinates of the points where the graphs of the lines of equations meet the y-axis.
5. The angles of a triangle are x, y and 40°. The difference between the two angles x and y is 30°. Find x and y.
6. If x = a and y = b is the solution of the equation x-y = 2 and x + y =4 then find the value of a and b.
7. In ΔABC, $\angle A = x^0$, $\angle B = 3x^0$ and $\angle C = y^0$. If 3y-5x = 30 prove that the triangle is right angled.
8. If 3x +7y = -1 and 4y-5x+14 =0, find he values of 3x-8y and y/x -2.
9. Is the pair of equations x-y = 5 and 2y-x =10 inconsistent? Justify your answer.
10. If the system of equations 4x- y =3 and (2k-1)x+(k-1)y = 2k +1 is inconsistent, then find k.
11. Solve the pair of linear equations $x - y = 2$ and $x + y = 2$. Also find p if $p = 2x + 3$
12. For what value of K the following system of equation are parallel.
    2x + Ky= 10, $3x + (k + 3)\,y = 12$

(3 Marks)

1. Draw the graphs of the pair of linear equations $x - y + 2 = 0$ and $4x - y - 4 = 0$. Calculate the area of the triangle formed by the lines so drawn and the x-axis.

2. For which value(s) of λ , do the pair of linear equations
   $\lambda x + y = \lambda 2$ and $x + \lambda y = 1$ have
   (i) no solution?
   (ii) infinitely many solutions?
   (iii) a unique solution?
3. For which values of a and b, will the following pair of linear equations have infinitely many solutions? $x + 2y = 1$ $(a - b)x + (a + b)y = a + b - 2$
5. Two years ago, Salim was thrice as old as his daughter and six years later, he will be four years older than twice her age. How old are they now?
6. The age of the father is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.
7. Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5.Find the numbers.
8. There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls.
9. A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for six days, while Anand paid Rs 16 for the book kept for four days. Find the fixed charges and the charge for each extra day.
10. In a competitive examination, one mark is awarded for each correct answer while ½ mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?

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11. Jamila sold a table and a chair for Rs 1050, thereby making a profit of 10% on the table and 25% on the chair. If she had taken a profit of 25% on the table and 10% on the chair she would have got Rs1065. Find the cost price of each.[500, 400]
12. It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for 4hours and the pipe of smaller diameter for 9 hours, only half the pool can be filled.How long would it take for each pipe to fill the pool separately?[20, 30]
13. Ankita travels 14 km to her home partly by rickshaw and partly by bus. She takes half an hour if she travels 2 km by rickshaw, and the remaining distance by bus. On the other hand, if she travels 4 km by rickshaw and the remaining distance by bus, she takes 9 minutes longer. Find the speed of the rickshaw and of the bus.
14. A person, rowing at the rate of 5 km/h in still water, takes thrice as much time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream.
15. Find the value of p and q for which the system of equations represent coincident lines $2x + 3y = 7$, $(p+q+1)x + (p+2q+2)y = 4(p+q)+1$
16. The larger of two supplementary angles exceeds the smaller by 180, find them.
17. A chemist has one solution which is 50% acid and a second which is 25% acid. How much of each should be mixed to make 10 litres of 40% acid solution.
18. When 6 boys were admitted & 6 girls left the percentage of boys increased from 60% to 75%. Find the original no. of boys and girls in the class.
19. Solve the following equations by the method of cross –multiplication:

    $mx - ny = m^2 + n^2$ and $x + y = 2m$

19. Half the perimeter of a rectangular garden, whose length is 4m more than its width is 36m .Find the dimensions of the garden.

20. If $x+1$ is a factor of $2x^3+ax^2 + 2bx +1$, then find the values of a and b given that $2a - 3b = 4$.

21. The age of the father is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

22. The larger of two supplementary angles exceeds thrice the smaller by 20 degrees. Find them.

23. Check graphically whether the pair of linear equations $3x + 5y = 15$, $x – y = 5$ is consistent. Also check whether the pair is dependent.

(4 Marks)

1. For which value(s) of k will the pair of equations $kx + 3y = k – 3$; $12x + ky = k$ have no solution?

2. Two rails are represented by the equations $x + 2y – 4 = 0$ and $2x + 4y – 12 = 0$. Represent this situation geometrically.

3. Solve for p and q: $[p+q] / pq =2$ and $[p-q] / pq =6$
4. Solve for x and y : $6 /[x+y] = 7/ [x-y] + 3$; $1/ 2[x+y] = 1/ 3[x-y]$

5. Form a pair of linear equations for : The sum of the numerator and denominator of fraction is 3 less than twice the denominator. If the numerator and denominator both are decreased by 1, the numerator becomes half the denominator.
6. Amar gives Rs. 9000 to some athletes of a school as scholarship every month. Had there been 20 ore athletes each would have got Rs. 160 less. Form a pair of linear equations for this.
7. Dinesh in walking along the line joining (1, 4) and (0, 6), Naresh is walking along the line joining (3, 4,) and (1,0). Represent on graph and find the point where both of them cross each other.

8. Form a pair of linear equations for the following situation assuming speed of boat in still water as 'x' and speed of stream '*y*' : A boat covers 32 km upstream and 36 km downstream in 7 hours. It also covers 40 km upstream and 48 km downstream in 9 hours.

9.A person, rowing at the rate of 5km/h in still water, takes thrice as much time in going 40 km upstream as in going 40km downstream. Find the speed of the stream.

10.Solve graphically the system of linear equations:

$4x – 3y + 4 = 0$

$4x + 3y – 20 = 0$

Find the area bounded by these lines and x-axis.

11.The sum of a two digit number and the number obtained by reversing the order of its digits is 165. If the digits differ by 3 ,find the number .

12.Two women and 5 men can together finish a piece of embroidery in 4 days ,while 3 women and 6 men can finish it in 3 days . Find the time taken by 1 woman alone , and that taken by 1 man alone to finish the embroidery.

13.Determine graphically, the vertices of the triangle formed by the lines y =x, 3y = x, x+ y = 8 .

IV. <u>Quadratic Equations</u>

(1 Mark)

1. Solve the following quadratic equation for x: $4\sqrt{3}x^2+ 5x + 2\sqrt{3} = 0$
2. For what values of k, the roots of the quadratic equation $(k + 4) x^2+(k+ 1)x + 1 = 0$ are equal?
3. Find the values of k for which the quadratic equation $9x^2-3kx + k = 0$ has equal roots.
4. If $x = –2$ is a root of the equation $3x^2+ 7x + p = 0$, find the values of k so that the roots of the equation $x^2+ k (4x + k –1) + p = 0$ are equal.
5. The positive value of k for which $x^2+Kx +64 = 0$ & $x^2- 8x + k = 0$ will have real roots .

(2 Marks)

1.A dealer sells a toy for Rs.24 and gains as much percent as the cost price of the toy. Find the cost price of the toy.
2. X and Y are centers of circles of radius 9cm and 2cm and XY = 17cm. Z is the centre of a circle of radius 4 cm, which touches the above circles externally. Given that $\angle XZY=90^0$, write an equation in r and solve it for r.
3. The sum of two numbers is 15. If the sum of their reciprocals is 3/10. Find the numbers.
4. Divide 19 into two parts such that sum of their squares is 193.
5. Divide 41 into two positive parts such that difference of their squares is 369.
6. The product of two consecutive odd numbers is 483. Find the numbers.
7. Divide 16 into two parts such that twice the square of the larger part exceeds the square of the smaller part by 164.

8. Find the roots of the equation $2x^2 - 5 x + 3 =0$ by the method of completing square.

(3 Marks)

1. The numerator of a fraction is one more than its denominator. If its reciprocal is subtracted from it, the difference is 11/30. Find the fraction.
2. The denominator of a fraction exceeds its numerator by 3. If one is added to both numerator and denominator , the difference between the new and the original fraction is 1/24. Find the original fraction.
3. A two digit number is such that the product of the digits is 14. When 45 is added to the number,then the digits interchange their places. Find the number.
4. A two digit number is such that the product of the digits is 18. When 63 is subtracted from the number, then the digits interchange their places. Find the number.
5. A two digit number is four times the sum of its digits and twice the product of its digits. Find the number.
6. The sum of ages of a son and his father is 35 years and the product of their ages is 150. Find their present ages.
7. The age of a father is equal to the square of the age of his son. The sum of the age of the father and five times the age of the son is 66 years. Find their present ages.
8. The length of hypotenuse of a right triangle is one unit more than twice the length of the Shortest side and the other side is one unit less than twice the length of the shortest side. Find the lengths of the other two sides.

(4 Marks)

1. The hypotenuse of a right triangle is $3\sqrt{5}$ cm. If the smaller side is tripled and the larger side isdoubled, the new hypotenuse will be 15 cm. Find the length of each side.
2. The hypotenuse of a right angled triangle is 6m more than twice the shortest side. If the third side is 2m less than the hypotenuse, find the sides of the triangle.
3. The area of a right angled triangle is 600 sq. cm. If the base of the triangle exceeds the altitude by 10 cm, find the dimensions of the triangle.
4. The length of a rectangle exceeds its width by 8 cm and the area of the rectangle is 240 sq. cm.Find the dimensions of the rectangle.
5. The side of a square exceeds the side of another square by 4cm. And the sum of the areas of the two squares is 400 sq. cm. Find the dimensions of the square.

V. <u>Arithmetic Progressions</u>

(1 Mark)

1. Which term of the sequence 4, 9, 14.... Is 124?

2. Find the 10^{th} term from the end of A.P 3, 8, 13, 18...253

3. For what value of K, the number x, 3x +k, 3x+6, are three consecutive terms of A.P

4. How many numbers of two digits are divisible by 8?

5. Find the middle term of A.P 1, 8, 15..505

6. Write next term of A.P ? 8, ? 18, ? 32....

(2 Marks)

1. What is the common difference of an A.P in which $a_{23} - a_{18} = 45$

2. Find first there terms of an A.P whose nth term is -5+2x

3. In the given A.P, find the missing terms 0, _, -8, -12, _.

4. Find the value of m so that m+2, 4m-6 and 3m- 2 are three consecutive terms of an AP.

5. For what value of 'K' the number 3K + 2, 4K +3 and 6K - 1 are the consecutive terms of an A.P.

6. Find the 12^{th} term from the end of the A.P. 3, 8, 13... 253.

7. Find the sum 3+ 11+ 19+ - - - +803.

8.Find the 20^{th}term from the last term of the A.P. :3,8,13,……..,253.

(3 Marks)

1**.** Find the sum of all odd integers between 1 and 100 which are not multiples of 4

2. How many terms of A.P 18, 16, 14.... Should be taken so that their sum is zero?

3. If the 10th term of an A.P is 47 and first term is 2, find the sum of the first 15 terms

4. Solve the equation: 2+5+8+.....+x =155

5. Which term of A.P 121, 117, 113... Is the first negative term?

6. How many multiples of 4 lie between 10 and 250?

7. IF the sum of n terms of an A.P is n^2+ 2n, find the A.P and the 20th term.

8. For what values of n nth term of the series 3, 10, 17....and 63, 65, 67.... are equal.

9. If 9^{th} term of an A.P is 0, prove that 29th term is double of the 19th term

10. The sum of three numbers in A.P. is 21 and their product is 231. Find the numbers,

11. Determine the AP whose 5^{th} term is 15 and the sum of its 3^{rd} and 8^{th} terms is 34.

12. Which term of an A.P 3, 10, 17..... will be 84 more than its 13^{th} term?

13. If the 10^{th} term of an A.P is 47 and first term is 2, find the sum of the first 15 terms.

(4 Marks)

1. A sums of Rs 1000 is invested at 8% simple interest per year. Calculate the interest at the end of each year. Do these interests form an AP? If so, find the interest at the end of 30 years making use of this fact

2. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

3. The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?

4. A sum of Rs 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs 20 less than its preceding prize, find the value of each of the prizes

5. Find the sum of all three digits numbers each of which leave the remainder 3 when divided by 5.

6. How many terms of the AP 78, 71, 64 .are needed to give the sum 468? Also, find the last terms of this AP.

7. If the sum of first nth terms of an AP is $3n^2$-2n. Find the AP and its 18^{th} terms.

8. Which terms of the AP 5, 15, 25 . . . will be 130 more than its 31th terms?

9. If the sum of 20^{th} terms of an AP is 1430. If the first term is 100. Find the last term and sum of 100^{th} terms.

10. If 7 times the 7^{th} term is to 11 times its 11th term of an AP then show that the 18^{th} terms of an AP is zero.

11. If pth terms of an AP is 1/q and qth term of AP is then show that the sum of pq terms is ½(pq+1).

12. How many three digits numbers are divisible by 7.

13. The first term, common difference and the last term of an AP are 12, 6 and 252 respectively. Find its sum.

14. In a given AP if pth term is q and the qth term is p, then show that the nth term is (p+q-n).

15. Find the sum of all three-digit natural numbers which are divisible by 13.

16. The sum of 'n' terms of the sequence is $3n^2$+4n. Find the n^{th} term and show that sequence of an A.P.

17. The sum of the third and the seventh terms of an A.P. are 6 and their product is 8. Find the sum of first 16 terms of the A.P.

.

18.Two A.P. have the same common difference. If the first terms of the A.P.s are 5 and 6 respectively, find the difference between the sum of their first 20 terms.

19.If sum of first p terms of an A.P. is q and the sum of first q terms is p, show that the sum of first (p+q) terms is – (p+q).

VI.Triangles

(2 marks)

1. L and M are respectively the points on the sides DE and DF of a triangle DEF such that DL = 4, LE = 4/3, DM = 6 and DF = 8. Is LM\\EF ? Give reason.

2. A vertical stick 20m long casts a shadow 10m long on the ground. At the same time, a tower casts a shadow 50m long on the ground. Find the height of the tower.

3. If ΔABC and ΔDEF are similar triangles such at $\angle A = 45^0$ and $\angle F = 56^0$, then find $\angle C$.

4. If $\Delta ABC \sim \Delta ZYX$, then name the angles equal to $\angle B$ and $\angle Z$ respectively.

5. In ΔABC, AB = 24cm, BC = 10cm and AC = 26cm . Is this triangle right triangle ?

(3 marks)

1. The lengths of the diagonals of a rhombus are 24cm and 32cm. Find the length of the side of the rhombus.

2. XY is drawn parallel to the base BC of a ΔABC cutting AB at X and AC at Y. If AB = 4BX and YC = 2cm, then find AY.

3. PQR is an isosceles triangle with QP = QR. If $PR^2 = 2QR^2$, prove that ΔPQR is right- triangle.

4. $\Delta ABC \sim \Delta DEF$. If AB = 4cm, BC =3.5cm, CA = 2.5cm and DF =7.5cm, then find perimeter of ΔDEF.

5. The lengths of the diagonals of a rhombus are 30cm and 40cm . Find the side of the rhombus.

6. In ΔABC, DE\\BC. If AD = 2.4cm, AE =3.2cm, DE = 2cm and BC = 5cm, find BD and CE.

7. In ΔABC, DE\\BC. If AD=4x-3, AE = 8x-7, BD = 3x -1 and CE = 5x -3, find the value of x.

8. If a line intersects sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, prove that AD/AB = AE/AC .

9. O is any point inside a rectangle ABCD, Prove that $OB^2 + OD^2 = OA^2 + OC^2$.

10. D, E and F are respectively the mid – points of sides AB, BC and CA of ΔABC. Find the ratio of the areas of ΔDEF and ΔABC.

(4 marks)

1. ABC is a right triangle right-angled at C. Let BC = a, CA = b, AB = c and let p be the length of perpendicular from C on AB. Prove that:

   i) cp = ab (ii) $1/p^2 = 1/a^2 + 1/b^2$.

2. State and prove basic proportionality theorem.

3. In an equilateral triangle with side a, prove that:

   i) Altitude = $\sqrt{3}/2$ a ii) Area = $\sqrt{3}/4\ a^2$.

4. D and E are points on the sides AB and AC respectively of a ΔABC such that DE\\BC and divides ΔABC into two parts, equal in area. Find BD/AB.

5. In PQR, PD $\perp$ QR such that D lies on QR. If PQ = a, PR = b, QD = c and DR =d, prove that:

   (a+b)(a-b) = (c+d)(c-d).

6. Prove that ratio of areas of two similar triangles is square of the ratio of their corresponding sides.

7. Prove that ratio of areas of two similar triangles is square of the ratio of their corresponding medians.

8. State and prove Pythagoras theorem.

9. Prove that radius of a circle is perpendicular to the tangent at point of contact.

VII.Coordinate Geometry

(1 Mark)

1. Find the distance between the prints A (10 cosx,0) and B (0, 10 sinx)

2. Find the area of ABC where A (2, 3), B (-2, 1) and C (3, -2)

3. Find the co-ordinates of the point which divides the line-segment joining the point (1, 3) and

(2, 7) in the ratio 3:4

4. Find the area of the triangle formed by the points O (0, 0), A (a, 0) and B (0, h).

5. AB is the diameter of a circle whose centre is (2, -3). If the co-ordinates of B are (1, 4), then find the co-ordinates of A.

6. Find the ratio in which the line-segment joining the points (-3, 4) and (1, -2) is divided by y-axis.

7. Find the point of trisection of the line-segment joining the points (-3, 4) and (1, -2).

(2 Mark)

1. If the area of a triangle formed by (x, 2x), (-2, 6) and (3, 1) is 5 square units, then find the value of x.

2. If the centroid of the triangle formed by the points (a, b), (b, c) and (c, a) is at the origin, then find the value of $a^3 + b^3 + c^3$.

3. The vertices of a Δ ABC are (1, 2), (3, 1) and (2, 5). Point D divides AB in the ratio 2:1 and P is the mid-point of CD. Find the coordinates of the point P.

4. The line joining the points (2, 1) and (5, - 8) is trisected at the points P and Q. If the point P lies on the line 2x - y + k = 0, find the value of k

5. The area of a triangle is 5. Two of its vertices are (2, 1) and (3, -2). The third vertex lies on y = x + 3. Find the third vertex.

6. Find the value of k, if the point P (0, 2) is equidistant from (3, k) and (k, 5).

7. Find the distance between the points ($a \cos 35^0$, 0) and (0, $a \cos 65^0$)

(3 Marks)

1. Find the coordinates of the point at which the line 3x + 2y = 12 intersects the x -axis.

2. Find the ratio in which the line 2x + 3y - 30 = 0 divides the line segment joining the points

(3, 4) and (7, 8). Find also the coordinates of the point of intersection.

3. Find the ratio in which the point P(m, 6) divides the join of A(- 4, 3) and B (2, 8). Also find the value of m.

4. Show that four point (2, -1); (3, 4); (-2,3) and (-3,-2) are vertices of a rhombus.

5. Find the area of the quadrilateral whose vertices taken in order are (-4,-2); (-3,-5); (3,-2) and (2, 3).

6. Find the coordinates of the points of trisection of the line segment joining (4,-1) and

(-2,-3).

(4 Marks)

1. The coordinates of the vertices of ΔABC are A(4, 1), B(3, 2) and C(0, K) Given that the area of ABC is 12 unit2, find the value of K

2. If two opposite vertices of a square are (5, 4) and (1, -6), find the coordinates of its remaining two vertices

3. If two vertices of an equilateral triangle be (0, 0), (3, 3), find the third vertex.

4. Find the coordinates of a point P on y-axis equidistant from two points A (-3, 4) and B (3, 6) on the same plane.

5. Find the value of K for which the points A (-5, 1); B (1, K); and C (4,-2) are collinear. Also, find the ratio in which B divides AC.

6. Find the ratio in which the line joining the point (2,-6) and (8, 4) is divided by x-axis. Find the coordinate of the point of division.

7. Prove that the points A (-4,-1); B (-2,-4); C (5,-6) and D (2, 3) are the vertices of a rectangle.

8. Find the coordinate of the points which divide the line segment joining the points (-2, 0) and (0,8) in four equal parts.

9. Find the point which divides the line segment joining the points (-3,-4) and (-8, 7) in the ratio of 7:5.

10. In what ratio the line x-y-2=0 divides the line segment joining the points (3,-1) and (8,9). Find,

also the coordinates of the point of intersection.

11. Find the coordinate of the points of trisection of the line segment joining the points (-1, 3) and (2, 5).

12. The vertices of a triangle are (3, 4); (7, 2); (-2,-3). Find the length of the median through the vertex A.

13. Find the area of a triangle whose vertices are (1,-1); (-4, 6) and (-3,-5).

14. Find the value of K, if the points (2, 3); (4, K) and (6, 3) are collinear.

15. Find the area of triangle whose vertices are (1, 2); (5, 3) and (18, 6).

16. Find the whether the points (4, 3); (5, 1) and (1, 9) are collinear.

17. Prove that the (10, -18), (3, 6) and (-5, 2) are the vertices of isosceles triangle.

18. Find the point on the y-axis which is equidistant from (-5, -2) and (3, 2).

19. Find the value of K, if the point P (0, 2) is equidistant from (3, K) and (K, 5).

20. Find the coordinates of a point which divides internally the line-segment joining the points

(-3,-4) and (-8, 7) in the ratio 7:5

21. Find the ratio in which the line-segment joining the points (6, 4) and (1, -7) is divided internally by x-axis.

22. Find the coordinates of the points which divide the line-segment joining the points (-4, 0) and (0, 6) in four equal parts.

VIII Introduction to trigonometry

(1 mark)

1. If sin θ = 3/5 , find the values of other trigonometric identities.

2. Prove that : cot θ – tan θ = $2\cos^2$ θ -1/sin θ . cos θ .

3.Verify ; (1 – $\cos^2$ θ) cosec θ = 1.

4. Show that : $\tan^2$ θ $\cos^2$ θ = 1- $\cos^2$θ .

5. Find : 2 tan 30^0 / 1+ $\tan^2$ 30^0 .

6. If tanA =4/3 find sinA

7. What is the maximum value of 1/secA

8. Write the value of acute angle Ɵ where √3 sinƟ = cosƟ

9.The value $\tan1^0$ $\tan2^0$ $\tan3^0$ …… tan890

10. Find the value of (1 – $\sin^2$A) $\sec^2$A

(2 marks)

1. In ∆ ABC , right angled at C , find cos A, tan A and cosec B , if sin A = 24/25.

2. Evaluate cos 48^0 cos 42^0 – sin 48^0 sin 42^0.

3. If sin θ = cos θ then find the value of 2 tan θ + $\cos^2$ θ.

4. Given that sin θ = a/b then find the value of tan θ.

5. If sin θ = 1/2 , 0 < θ < 90, find the value of cos θ and tan θ.

6. ∠A and ∠B are acute angle such that cosA = cosB . Show that ∠ A = ∠ B

7.If A = 30^0 Verify that cos3A = $4\cos^3$A – 3cosA

8.Express $\cos75^0$ + $\cot75^0$ in term of angle between 0^0 to 30^0

9. Evalute $\frac{sin20}{cos70}$

10. If sin5A = cos4A and where 5A and 4A are acute angles find the value of A.

(3 marks)

1. Find an acute angle θ when cos θ - sin θ / cos θ + sin θ = 1- √3 / 1+√3.

2. evaluate : 3 cos 68^0 X cosec 22^0 – ½ tan 43^0 X tan 47^0 X tan 12^0 X tan 60^0 X tan 75^0 .

3. Prove that 1+ $\cot^2\theta$/ 1+ cosec θ= cosec θ.

4. If tan (A+B) = √3 and tan (A - B) = 1/√3 ; find A and B.

5. Evaluate : sin 25^0 cos 65^0 + cos 25^0 sin 65^0.

6. If A, B,C are interior angles of a triangle ABC prove that $\sin(\frac{B+C}{2}) = \cos\frac{A}{2}$.

7.Prove that $\frac{1}{1+sinA}+\frac{1}{1-sinA} = 2sec^2A$

8. Prove that $\frac{\tan A+sinA}{tanA-SinA} = \frac{secA+1}{SecA-1}$

9. If cosA+sinA =$\sqrt{2cosA}, show\ that\ cosA - sinA = \sqrt{2sinA}$.

10. If x $sin^3\Theta$ + y $cos^3\Theta$ = sin Θ . cos Θ and x sinΘ = y cos Θ, prove that $x^2 + y^2 = 1$.

(4 marks)

1. Prove that $\frac{cosA}{1-\tan A} + \frac{\sin A}{1-\cot A} = \cos A + \sin A$.

2. prove that $tan^2\Theta + cot^2\Theta + 2 = sec^2\Theta.cosec^2\Theta$

3. Prove that $\frac{\tan A+ \sec A-1}{\tan A- secA+1} = \frac{1+sinA}{\cos A}$

4. if sec θ= x + 1/4x prove that sec θ+ tan θ = 2x or 1/2x.

5. Prove that (1/ cosec x +cot x) – 1/sin x = 1/ sin x – 1/ (cosec x – cot x).

6. Prove that tan θ/ 1- cot θ + cot θ / 1- tan θ = 1+ sec θ cosec θ = 1+ tan θ + cot θ

7. If tan θ +sin θ = m and tanθ - sin θ= n show that m – n = 4 √mn.

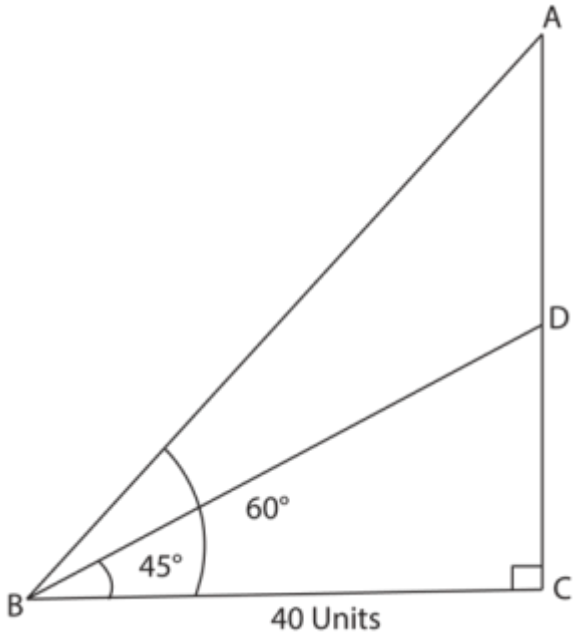
IX APPLICATIONS OF TRIGONOMETRY

(1 Mark)

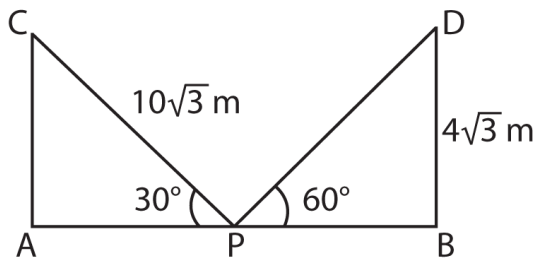
1. A tower of height 40 m casts shadow of 40√3 m when sun's elevation is θ. Find θ.
2. The length of shadow of a tower on the ground is 1/√3 times the height of the tower. Find the angle of elevation of the sun.
3. The angle of depression of a point from the top of a 120 m tower is 60°. Find the distance of the point from the foot of the tower.
4. The angle of depression of a point from the top of a 100m high tower is 60°. Find the distance of point from the tower.
5. Find the angle of elevation of a point to the top of a tower if it's at a distance √3 times the height of tower.
6. A pole 10 m high casts a shadow 10 m long on the ground. What is the elevation of the Sun?

(2Marks)

1. In the given figure, find the measure of AD.

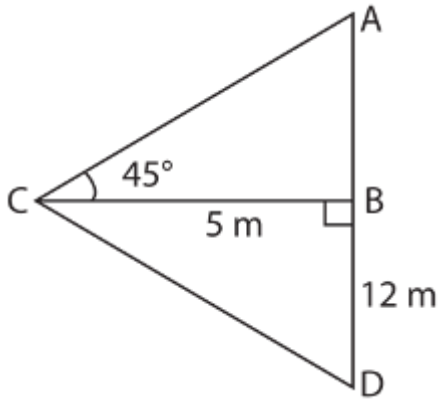


2. From a point on the ground 20 m away from the foot of a vertical tower the angel of elevation of the top of the tower is 60°. Find the height of the tower.
3. From a point 30 m away from the foot of a tower, the angle of elevation of the top of the tower is 30°. Find the height of tower. (Use √3 = 1.732)
4. A tall tree is broken in wind is such a way that its top touches the ground making an angle of 30° with the ground. The distance from the foot of the tree to the point where the top touches the ground is 30 m. find the height of the tree. (Use √3 = 1.73)
5. Find AB from the given figure



(**3 Marks)**

1. The angle of elevation of top of a building from the foot of the tower is 45° and the angle of elevation of the top of the tower from the foot of the building is 60°. Find the height of building if the tower is 40 m high. (√3 = 1.732)
2. The angle of elevation of the top of a tower at the foot of a house is 60° and the angle of elevation of the top of house at the foot of tower is 30°. If the house is 20 m high, what is the height of tower.
3. From the given figure find the perimeter.



4. The angle of elevation of the top (T) of a building (BT) from the foot (F) of a tower (FA) is 30° and the angle of elevation of the top (A) of the tower (FA) from the foot (B) of the building (BT) is 60°. If the height of the tower (FA) is 150 m, find the height of the building (BT).
5. In Δ ABC, AB = 8 cm, AC = 5 cm and m ∠A = 50°. Then What is the length of the perpendicular from C to AB ? Find the length of BC. [sin 50° = 0.7660, cos 50° = 0.6428, tan 50° = 1.1918]

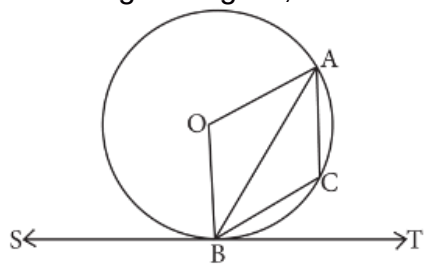
(**4 Marks)**

1. The angles of depression of two ships from the top of a light house on the same side of it are 45° and 60°. Find the height of light house, if the ships are 300 m apart.
2. The angles of elevation of the top of a tower from two points at distance of 8 m and 9 m from the base of tower and in the same straight line with it are complementary. Find the height of tower.
3. At a point 10 m above the lake water, the angle of elevation of a cloud is 30°. The angle of depression of the reflection of the cloud in the lake is 60°. Find the height of cloud above the lake.
4. The angle of elevation of a plane from a point on the ground is 60°. After a flight of 20 seconds, the angle of elevation changes to 30°. If the plane is at a height of 2400√3 m, find the speed of the jet plane.
5. From an aeroplane 1500 meter above the sea level two ships are marked sailing towards it in the same direction. The angles of depression of the ships observed from aeroplane are 60° and 30° respectively. What is the distance between the two ships? (use √3=1.732)
6. Two pillars of equal height stand on the either side of the road which is 100 mt. wide. The angles of elevation of the top of the pillar are 60^0 and 30^0 from a point on the road between the pillars. Find the position of the point between the pillars and height of the pillars.
7. An aeroplane attained altitude of 200mts. Observes the angle of depression of opposite point on two banks of a river to be 45^0 and 60^0. Find the width of the river.

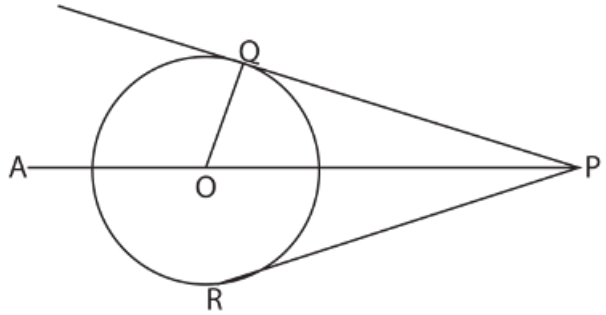
X <u>CIRCLES</u>

(1 Mark)

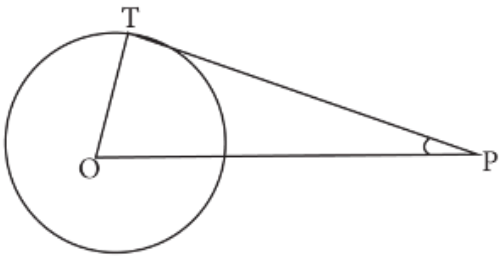
1. In the given figure, AB is a chord of a circle with centre at O. ∠ABT = 80°. Find ∠AOB



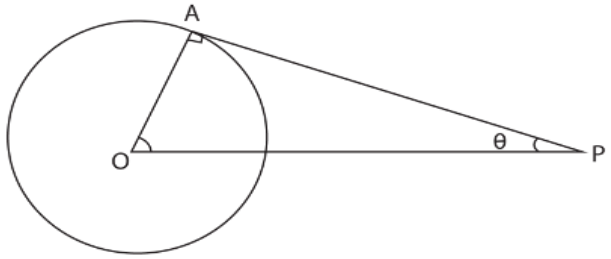
2. In the given figure, PQ is the tangent. OQ = 6 cm, OP = 10 cm find PR.



3. In the given figure, OP = diameter, OT is radius, find ∠OPT.



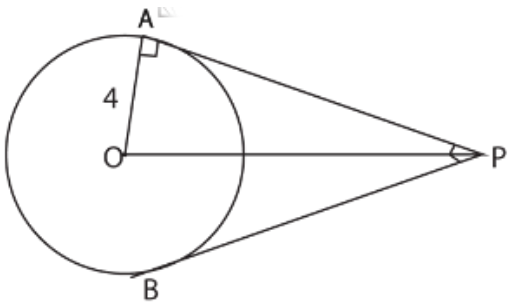
4. From the given figure, AP = 2r find ∠APO.



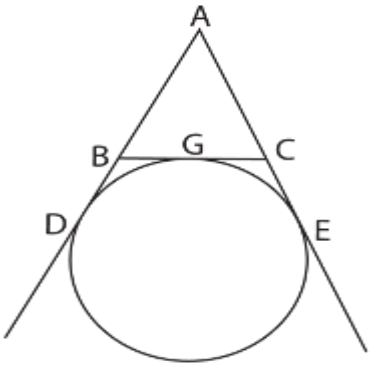
5. Two circles of radii 8.2 cm and 3.6 cm touch each other externally. Find the distance between their centres.

(2 Marks)

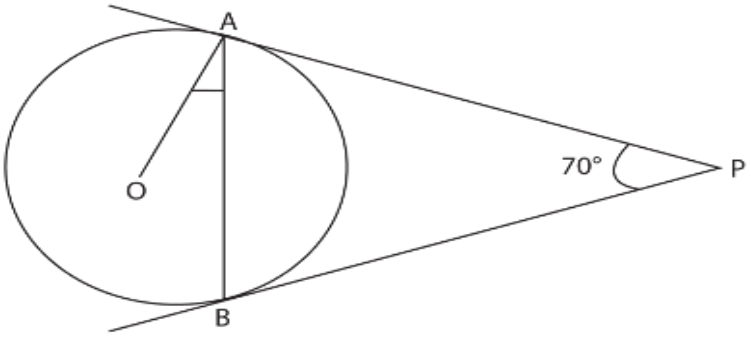
1. In the figure, PA & PB are two tangents. If ∠AOP= 60°, find PB.



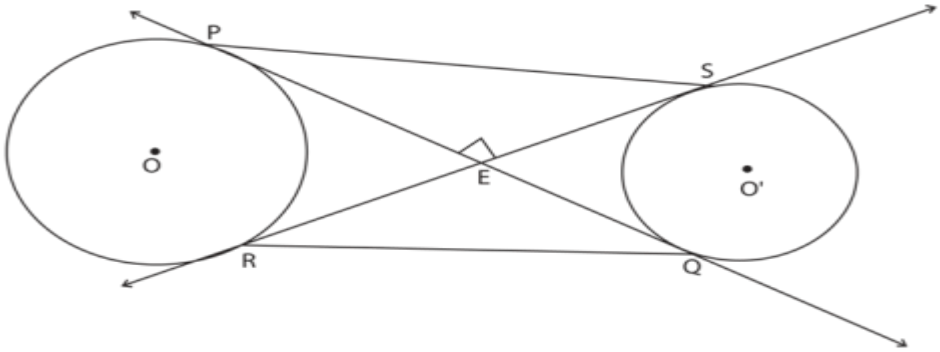
2. In the given figure the circle touches BC of ∆ ABC at G. If AD = 12 cm find the perimeter of ∆ ABC.



3.PA & PB are the tangents inclined at an angle of 70°. Find ∠OAB.



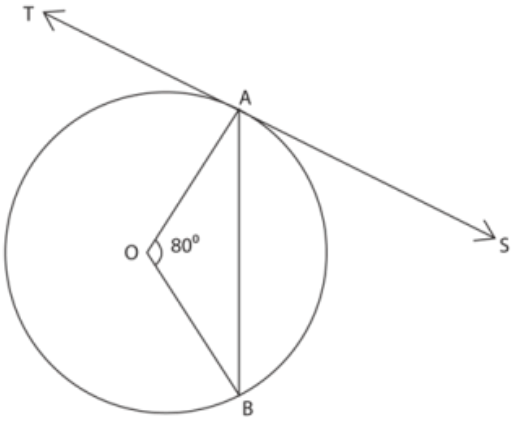
4. In the given figure, PQ & RS are two common chords intersecting at an angle of 90°. Prove that PS = RQ



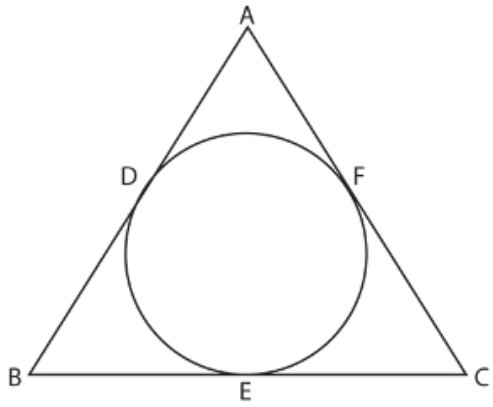
5. The circumference of a circle is 44 cm. Find the area of quadrant.

(**3 Marks)**

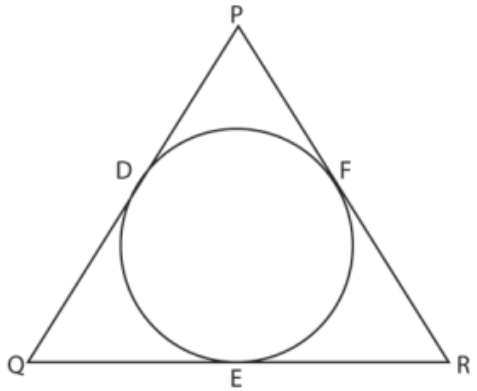
1. Prove that the lengths of the tangents drawn from an external point to a circle are equal.
2. In the given figure AB is a chord with centre at O and ST is a tangent. If ∠AOB = 80° find ∠BAS.



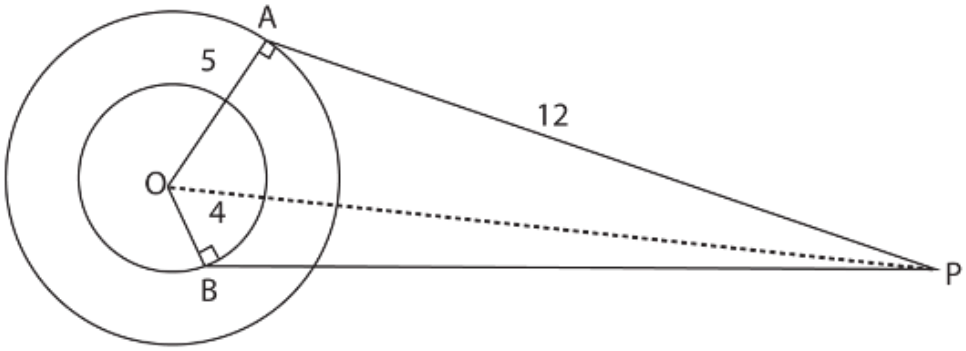
3. A circle is inscribed is a triangle. AB = 14 cm, BC = 10 cm, AC = 18 cm find the lengths of AD, BE & CF.



4. In the given figure, the incircle of ∆ PQR touches the sides PQ, QR & PR at the points D, E & F respectively. Prove that perimeter of ∆ PQR = 2(PF + QD + ER)



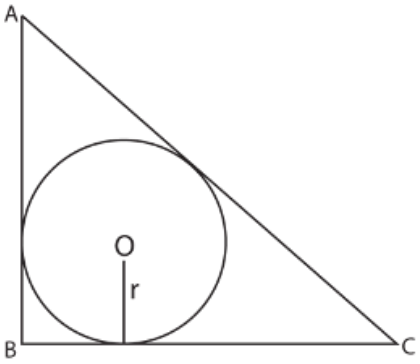
5. Tangents PA & PB are drawn from an external point P to two concentric circles with centre O and radii 5 cm and 4 cm respectively as shown in figure. If AP = 12 cm, find BP.



(**4 Marks)**

1. Prove that the line segment joining the points of contact of two parallel tangents to a circle is a diameter of the circle.

2. Δ ABC circumscribes a circle of radius r. If AB = 8 cm and BC = 6 cm find radius r if $\angle B = 90°$



3. If a circle touches all the four sides of a quadrilateral PQRS, prove that PQ + RS = PS + RQ

4. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

5. From an external point P two-tangents PA & PB are drawn to a circle. Prove that OP is the bisector of AB.

XI CONSTRUCTIONS

Q.1. Construct $\Delta PQR \sim \Delta ABC$ in which AB=6.2 cm, BC=5.4 cm and AC=4 cm, using scale factor $\frac{1}{3}$

Q.2 Construct a ΔABC in which base BC=7 cm, altitude AD = 5 cm and BD= 3 cm. Construct another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of ΔABC .

Q.3. draw a circle of radius 6cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

Q.4. Draw a pair of tangents to the circle of radius 5 cm which are inclined to each other at an angle of 60^0 .

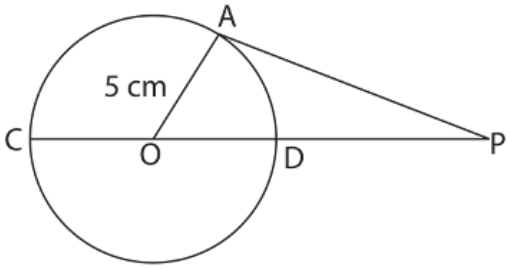
Q.5. Draw two concentric circles of radii 3 cm and 5 cm . Taking a point on outer circle construct the pair of tangents to the other. Measure the length of a tangent and verify it by actual calculation.

Q.6. Draw a parallelogram ABCD in which BC=5 cm, AB=3 cm and angle ABC=60^0, divide it into triangles BCD and ABD by the diagonal BD. Construct triangle $BD'C'$ similar to triangle BDC with scale factor 4/3.

XII AREAS RELATED TO CIRCLES

(1 Mark)

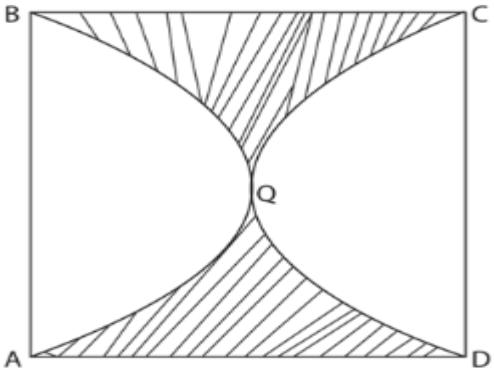
1. What is the perimeter of a semicircle with diameter 14 cm.
2. The radii of two circles are 5 cm & 12 cm. Find the radius of the circle whose area in the sum of areas of two circles.
3. Find the length CP if AP=12cm from the fig.



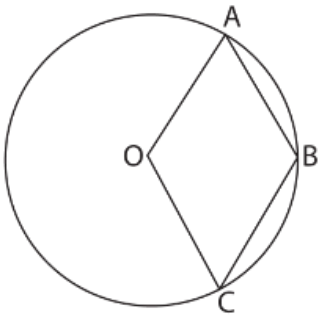
4. Find the perimeter of a semicircle of radius 7 cm.
5. The perimeter of a circle is numerically is equal to its area. Find the radius of circle.

(2 Marks)

1. Find the diameter of the circle whose area is equal to the sum of areas of two circles of radii 5 cm & 12 cm respectively.
2. Find the perimeter of the shaded region in the given figure, if ABCD is a square of side 21 cm & AQB and CQD are semicircles.



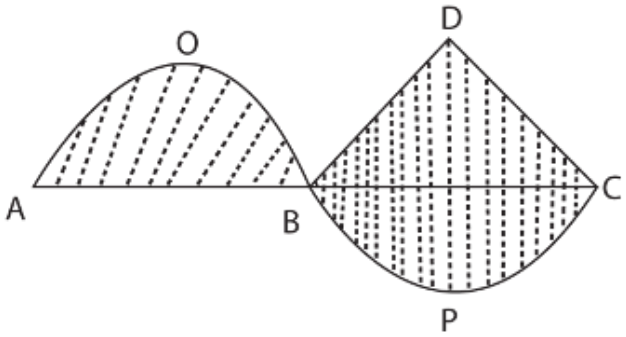
3. The perimeter of sector of a circle of radius 4.9 m is 31.5 m. Find the area of the sector.
4. In the given figure, OABC is a rhombus whose three vertices A, B, C are on the circle with centre at O. If the area of rhombus is 128√3 cm2. Find the perimeter of circle.



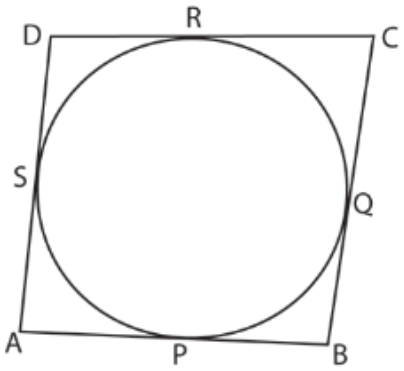
5. Find the perimeter and area of the sector of a circle of radius 6 cm with central angle 35°.

(3 Marks)

1. A 7 m wide road surrounds a circular park with circumference 176 m, find the cost of leveling the road at rate of Rs 12/m2.
2. In the given figure, AOB & BPC are two semicircles with BCD an equilateral triangle. Find the perimeter of the figure if AB = BC = 14 cm

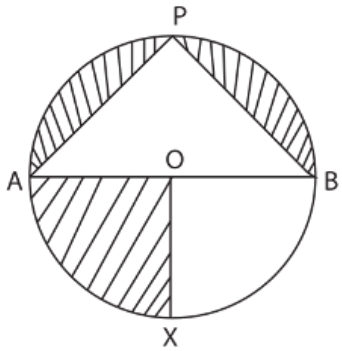


3. Find the area of minor segment APB in the given circle of radius 7 cm & ∠AOB = 60°
4. The perimeter of a circle of radius 3.8 cm is 11.2 cm. Find the area of sector.
5. In the given figure, a circle touches all the four sides of a quadrilateral ABCD with AB = 8 cm, BC = 10 cm and CD = 5 cm. Find AD.

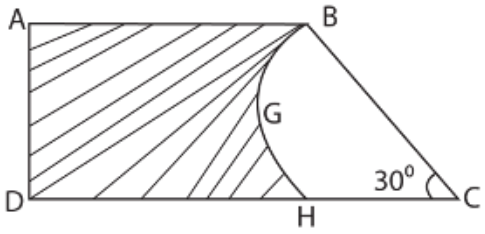


(**4 Marks)**

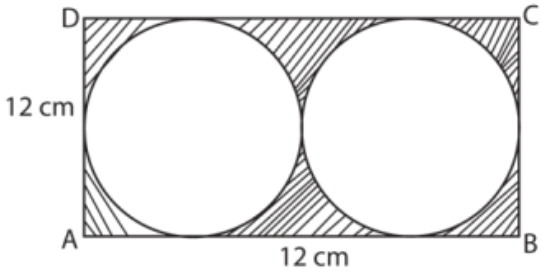
1. Find the area of minor & major segment of a circle of radius 21 cm, when its central angle is 120°.
2. In the given figure, O is the centre of circle . If AP = 6 cm, PB = 8 cm find the area of the shaded region. If ∠AOX = 90°



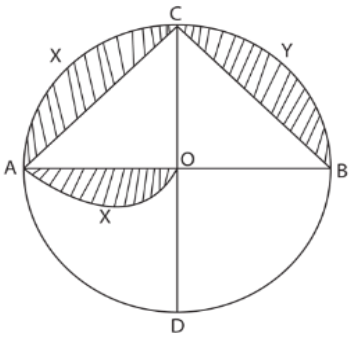
3. In the figure ABCD is a trapezium with AB | | CD & ∠BCH = 30° BCHG is a sector with centre at C and AB = 9 cm, DH = 6 cm, BC = 5 cm. Find the area of shaded region (use π = 3.14)



4. From the figure, given find the area of shaded region if ABCD is a square with side 12 cm.



5. In the given figure, AB & CD are the diameter of length 14 m which are ⊥r to each other. Find the area of the shaded region.



XIII SURFACE AREAS AND VOLUME

(1 Marks)

1. The surface area of the sphere is 2464 sq.cm. Find its radius.
2. Through a cylindrical tunnel of diameter 21 meters water flows uniformly at the rate of 18 km per hour. How much water will flow through it in 20 minutes?
3. A cone and a cylinder have bases of equal area. The height of the cone is 9 times that of the cylinder. If the cylinder can hold 150 cu.cm of water, what is the capacity of the cone?
4. The internal and external radii of a hollow cylinder are 12 cm and 18 cm respectively. If its height is 14 cm, then find its curved surface area.

   $\left(\text{Take } \pi = \frac{22}{7}\right)$
5. Radius and slant height of a cone are 20 cm and 29 cm respectively. Find its volume.

(2 Marks)

1. A hemispherical bowl of radius 7 cm is full with water. The water from the bowl is to be emptied into a cylindrical vessel of radius 3.5 cm. Calculate the height of cylindrical vessel.
2. What happens to the volume of cylinder if radius of base is halved keeping height same.
3. In a cone, the ratio of radius to slant height is 7 : 13. Its curved surface area is 1144 cm2. find the radius.
4. A solid metallic sphere of radius 21 cm is melted and recasted to a no. of cones with radius 7 cm and height 28 cm. Find the no. of cones so formed.
5. 21 glass sphere each of radius 4 cm are packed in a cubical box with dimensions 12 cm × 8 cm × 8 cm and. Find the volume of air in the box.

(3 Marks)

1. A tent is in the form of a cylinder surmounted by a conical top. If the height and radius of cylindrical part are 2.8 m and 2 m and slant height of the top is 3.2 m, find the area of canvas used for the tent.

2. A cylindrical reservoir is 21 m in diameter. Water is passed into it at 420 litres per minute. Find the rise of water level is the reservoir per hour.
3. A sphere of radius 5 cm is dropped into a cylindrical vessel partly filled with water. The diameter of the base of vessel is 20 cm. If the sphere is completely submerged, find the rise of level of water.
4. A toy is in the form of cone on a hemisphere of diameter 7 cm. The total height of toy is 14.5 cm. Find the volume of the toy.
5. 168 cones each of diameter 7 cm and height 6 cm are melted to form a metallic hemisphere. Find the radius of hemisphere and the total surface area.

(**4 Marks)**

1. The radii of the circular ends of a bucket of height 15 cm are 7 cm and R. If the volume of bucket is 5390 cm3 find R.
2. A copper rod of diameter 4 cm and length 8 cm is drawn into a wire of length 40 m of uniform thickness. Find the thickness of the wire.
3. The height of circular cone is trisected by two planes running parallel to the base. Find the ratio of the volumes of the three cones thus formed.
4. A metallic right circular cone 30 cm high where vertical angle is 600 is cut into two parts at the middle of its height by a plane parallel to its base. The frustum so obtained is drawn to a wire of radius $\frac{1}{30}\ cm$. Find the length of the wire.
5. The height of a cone is 42 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume is 1/64 of the volume of the given cone, find the height at which the section is made.

XIV STATISTICS

1. Which graphical representation helps in determining the mode of frequency distribution.

2. Write the formula of mode in symbol notation.

3. Consider the following frequency table

Class	0 – 10	10 – 20	20 – 30	30 – 40	, 40 – 50	50 – 60
Frequency	3	9	15	30	18	5

Determine the modal class.

4. What is the empirical relation between mean , median and mode .

5. Which measure of central tendency is given by the x – coordinate of the point of intersection of the 'more than ogive' and 'less than' ogive.

6. For the following distribution find the modal class

Mark	below 10	below 20	below 30	below 40	below 50	below 60
No. of students	3	12	27	57	75	80

7. If the mean of the following distribution is 2.6 then find the value of k

Xi	1	2	3	4	5
Fi	*k*	5	8	1	2

8. If the mean of the following data is 18.75 find the value of *p*.

Xi	10	15	p	25	30
Fi	5	10	7	8	2

9. Find the mean age of 100 residents of a town from the following data

Age in yrs.	above 0	above 10	above 20	above 30	above 40	above 50	above 60	above 70
No. of persons	100	90	75	50	25	15	5	0

10.

Height in cm	150-155	155-160	160-165	165-170	170-175	175-180
No. of students	15	13	10	8	9	5

What is the sum of the lower limit of the modal class and upper limit of the median class.

11. For the following distribution calculate mean

Class	25-29	30-34	35-39	40-44	45-49	50-54	55-59
Frequency	14	22	16	6	5	3	6

12. The length of 40 leaves of a plant are measured correctly to the nearest mm and the data obtained is represented in the following table .Find median length of leaves.

Length(mm)	118-126	127-135	136-144	145-153	154-162	163-171	172-180
No, of leaves	3	5	9	12	5	4	2

13. Find the mean of following distribution:

X	4	6	9	10	15
F	5	10	10	7	8

14. The following data gives the weight of 30 students of a class .Find the median weight of the students.

Weight (kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	Total students
No of students	2	3	8	6	6	3	2	30

15. Draw a less than type and a more than type ogive from the given data , get the median mark from the graph .

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students	4	6	10	10	25	22	18	5

16. Daily income of 50 workers of a factory are given below.

Daily income(Rs.)	100-120	120-140	140-160	160-180	180-200
No. of workers	12	14	8	6	10

Find the median income of the workers.

17. The following table gives the production yield per hectare of wheat of 100 farms of a village.

Production in kg	50-55	55-60	60-65	65-70	70-75	75-80
No. of farms	2	8	12	24	38	16

Change the above into more than type table.

18. Calculate the value of mode for the following frequency distribution

Class	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40
Frequency	2	5	8	9	12	14	14	15	11	13

19. Find the mode of the following data-

I – 3,5,7,4,5,3,5,6,8,9,5,3,5,6,9,7,4

II – 3,3,7,4,5,3,5,6,8,9,5,3,5,3,6,9,7

III – 15,8,26,25,24,15,18,20,24,15,19,15

XV PROBABILITY.

(1 Mark)

1. Two coins are tossed. What is the probability of getting at least 1 heads?
2. What is the probability of getting an odd number when a die is thrown?
3. Find the probability of getting a number multiple of 2 when a die is thrown.
4. Two dice are rolled once. What is the probability of getting a number on the two dice whose product is 6.
5. What is the probability of getting an even number in the throw of a die?

(2 Marks)

1. A card in drawn randomly from a pack of 52 cards. Find the probability of getting a

   (i) a black king

   (ii) a face card
2. A card is drawn randomly from well shuffled pack of 52 cards. Find the probability that the drawn card is neither jack nor an ace.
3. Two dice are rolled. What is the probability of getting

   (i) the sum of numbers on two dice is 11.

   (ii) odd numbers on both dice.
4. A box contains 30 cards from 1 to 30. A card is drawn random from the box. Find the probability that

   (i) It is divisible by 2 or 5

   (ii) a prime number
5. Find the probability of getting 53 Tuesdays in a leap year.

(3 Marks)

1. A jar contains blue, red & green balls. The probability of getting blue ball is 1/3, that of red ball is 1/5. Find the no. of balls if no. of green balls is 14.

2. A bag contains 7 red, 9 white, 6 green and 11 black balls. If one ball is drawn at random, find the probability that it is (i) green (ii) not red (iii) either white or green

3. A bag contains 7 white and some red balls. If the probability of drawing a red ball is doubles that of white ball, find the no. of red balls in the big.

4. A bag contains 10 white, 5 black, 3 green and 2 red balls. One ball is drawn at random. Find the probability that the ball drawn is white or black or green.

5. A die is thrown twice. Find the probability that at least one of the two throws comes up with the number 5.

6. A bag contains 4 red, 3 green and 8 white balls. One ball is drawn at random from the bag. Find the probability of getting.
   (i) a red ball or a white ball
   (ii) Neither a red ball nor a white ball.

(4 Marks)

1. A card is drawn at a random from a well-shuffled deck of playing cards. Find the probability that the card drawn is

   (a) a red king

   (b) either king or queen

   (c) an ace

   (d) neither a jack nor a king.

2. All the black face cards are removed from a pack of 52 cards. One card is drawn at random from the rest of the cards. Find the probability that the drawn card is

   (i) of black color

   (ii) a king

   (iii) an ace

   (iv) a non face card

3. A box contains 200 red balls, 150 black balls and 100 yellow balls. If a ball is drawn randomly from the box, then find the probability that it will be a

   (a) yellow ball (b) neither yellow nor black ball (c) not a red ball

4. Two coins are tossed simultaneously. Find the probability of getting.

   (i) at least one tail

   (ii) no tail

   (iii) at most one tail

   (iv) two tails

5. Three unbiased coins are tossed together. Find the probability of getting.

   (a) two tails (b) all tails (c) at least one tail (d) at most two heads

6. One card is drawn at random from a well-shuffled deck of 52 cards. Find the probability of getting
   (A) a king of red colour. (B) a face card.
   (C) a red face card. (D) the jack of hearts