DELHI PUBLIC SCHOOL, DURGAPUR

QUESTION BANK & REVISION SHEET FOR PERIODIC ASSESSMENT II (2018-19)

CLASS-X

SUB:MATHEMATICS

REAL NUMBERS

1. Find the H.C.F. of i)196 and 38220 ii)4052 and 12576 by using Euclid's division algorithm.
2. Prove that √3 is an irrational number.
3. Prove that 2 + √ 5 is an irrational number .
4. Prove that $\frac{2\sqrt{2}}{5}$ is an irrational number.
5. Find the HCF of 52 and 117 and express it in the form 52x +117y.
6. Prove that square of any positive integer is of the form 3q or 3q + 1 for some integer q.
7. Explain why 7 * 11* 13 + 13 is a composite number.
8. Without doing the long division find if $\frac{987}{10500}$ will have terminating or non terminating decimal expression.
9. Prove that one of any three consecutive positive integers must be divisible by 3 .
10. For any positive integer n, prove that $n^3 - n$ is divisible by 6.
11. Use Euclid's division lemma to show that the cube of any positive integer is either of the form 9m,9m+1 or 9m+8 for some integer m.
12. 15 pastries and 12 biscuits packets have been donated for a school fete. These are to be packed in several smaller identical boxes with same number of pastries and biscuit packets each.How many biscuit and pastries will each box contain?
13. Two brands of chocolates are available in packs of 24 and 15 respectively.If I need to buy an equal number of chocolates of both kinds,what is the least number of boxes of each kind I would need to buy?
14. Find the smallest number which leaves remainder 8 and 12 when divided by 28 and 32 respectively.
15. In a seminar the number of participants in Hindi, English and mathematics are 60,84 and 108 respectively.Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.
16. If a and b are two positive integers such that a>b ,then prove that one of the two numbers $\left(\frac{a+b}{2}\right)$ and $\left(\frac{a-b}{2}\right)$ is odd and the other is even.

POLYNOMIALS

1. Find a quadratic polynomial whose zeroes are 5 + √2 and 5 - √ 2 .
2. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients of the polynomial.
3. If √5 and -√5 are two zeroes of the polynomial $x^3 + 3x^2 - 5x - 15$, find its third zero.
4. Obtain all zeroes of $x^4 - 7x^3 + 17x^2 - 17x + 6$, if two of its zeroes are 3 and 1.
5. Divide $6x^5 + 4x^4 - 27x^3 - 7x^2 - 27x - 6$ by $2x^2 - 3$ and verify the answer using division algorithm.
6. Check whether $g(x) = x^2 - 3$ is a factor of $p(x) = 2x^4 + 3x^2 - 2x^2 - 9x - 12$
7. α and β are zeroes of $x^2 + 5x + 5$, find the value of $\alpha^{-1} + \beta^{-1}$.
8. α and β are zeroes of quadratic polynomial $kx^2 + 4x + 4$, find the value of k such that $(\alpha + \beta)^2 - 2\alpha\beta = 24$
9. Obtain all the zeroes of $3x^4 + 6x^3 - 2x^2 - 10x + 5$, if two of its zeroes are $(\sqrt{\frac{5}{3}})$ and $(-\sqrt{\frac{5}{3}})$.
10. On dividing the polynomial $4x^4 - 5x^3 - 39x^2 - 46x - 2$ by the polynomial g(x) , the quotient and the remainder were $x^2 - 3x - 5$ and $-5x + 8$ respectively . Find g(x).
11. If two zeros of a polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are (2+√3) and (2-√3).find other zeros.

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. Find value of k for which the system of equations x – ky = 2 and 3x + 2y = -5 has a unique solution.
2. Determine value of k for which the system of equations 4x + y = 3 ., 8x + 2y = 5k has infinite solutions .
3. Find the value of a and b for which the system of equation2x – 3y = 7 and (a + b) x – (a + b – 3) y = 4a + b has infinite number of solutions.
4. The sum of digits of a two digit number is 15 .The number obtained by interchanging the digits exceeds the given number by 9 . Find the number.
5. Two years ago, a father was five times as old as his son . Two years later, his age willbe 8 more than three times the age of the son . Find the present ages of the son and the father .
6. If 1 is added to each of numerator and denominator of a fraction it becomes ⅔ . If 1 is subtracted from each of the numerator and denominator it becomes $\frac{3}{5}$. Find the fraction.
7. X takes three hours more than Y to walk 30 km. But if X doubles his speed, he is ahead of Y by $1\frac{1}{2}$ hours. Find their speed of walking.
8. Solve : (i) $\frac{x}{a}+\frac{y}{b}=2, ax-by=a^2-b^2$ (ii) $\frac{xy}{x+y}=\frac{1}{5}, \frac{xy}{x-y}=\frac{1}{7}$ (iii) $\frac{4}{x}+5y=7, \frac{3}{x}+4y=5, x\neq 0$
9. Draw the graphs of the equation 5x – y = 5 and 3x – y = 3 . Determine the coordinates of the vertices of the triangle formed by the lines and the y- axis and calculate the area of the triangle formed.
10. Draw the graphs of the equations 3x – 4y + 6 = 0, 3x + y – 9 = 0 . Determine the coordinates of the vertices of the triangle formed by the lines and the x- axis and calculate the area of the triangle formed.
11. Solve the following system of equations:

(I) $0.4x+0.3y=1.7, 0.7x-0.2y=0.8$ (II) $7(y+3)-2(x+2)=14$, $4(y-2)+3(x-3)=2$

(III) $4x+\frac{6}{y}=15, 3x-\frac{4}{y}=7$ (IV) $\frac{x}{3}+\frac{y}{4}=11, \frac{5x}{6}-\frac{y}{3}=-7$

(V) $\frac{1}{7x}+\frac{1}{6y}=3, \frac{1}{2x}-\frac{1}{3y}=5$ (VI) $\frac{6}{x+y}=\frac{7}{x-y}+3, \frac{1}{2(x+y)}=\frac{1}{3(x-y)}$

(VII) $\frac{xy}{x+y}=\frac{6}{5}, \frac{xy}{y-x}=6$ (VIII) $x+y=5xy, 3x+2y=13xy$

(IX) $\frac{2}{3x+2y}+\frac{3}{3x-2y}=\frac{17}{5}, \frac{5}{3x+2y}+\frac{1}{3x-2y}=2$ (X) $99x+101y=499, 101x+99y=501$

12. Solve the following systems of equations by the method of cross multiplication:

(i) $\frac{x}{a}=\frac{y}{b}, ax+by=a^2+b^2$ (ii) $\frac{x}{a}+\frac{y}{b}=a+b, \frac{x}{a^2}+\frac{y}{b^2}=2$

(iii) $(a-b)x+(a+b)y=2a^2-2b^2, (a+b)(x+y)=4ab$

13. Find the value of k for which the equations $2x+3y-5=0, 6x+ky-15=0$, have infinitely many solutions.
14. Find the value of k for which the equations $2x-ky+3=0, 3x+2y-1=0$, have no solution.
15. Find the value of a and b for which the system of equations 2x-3y =7 , (a + b)x – (a+b – 3)y = 4a + b, have infinite number of solutions.

16. For what value of k, the following equations $x + 2y + 7 = 0$, $2x + ky + 14 = 0$, will represent the coincident lines.
17. For what value of k the following equations $4x + 6y = 11$, $2x + ky = 7$ will be inconsistent?
18. 3 bags and 4 pens together cost Rs. 257 whereas 4 bags and 3 pens together cost Rs. 324. Find the cost of 1 bag and 10 pens
19. On selling a T.V. at 5% gain and a fridge at 10% gain, a shopkeeper gains Rs. 2000. But if he sells the T.V. at 10% gain and the fridge at 5% loss. He gains Rs. 1500 on the transaction. Find the actual prices of T.V. and the fridge.
20. A two – digit number is 4 more than 6 times the sum of its digits. If 18 is subtracted from the number, the digits are reversed. Find the number.
21. The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If the numerator and the denominator are increased by 3, they are in the ratio 2:3, determine the fraction.
22. Two years ago, a father was five times as old as his son. Two years later, his age will be 8 more than three times the age of the son. Find the present ages of the father and son.
23. A boat goes 24 Km upstream and 28 km downstream in 6 hours. It goes 30 Km upstream and 21 Km downstream in 6½ hours. Find the speed of the boat in still water and also the speed of the stream.
24. A man covers 600 Km partly by train and partly by car. If the car covers 400 Km by train and the rest by car it takes him 6 hrs and 30 minutes. But if he travels 200 Km by train and the rest by car, he takes half an hour longer. Find the speed of the train and that of the car.
25. The incomes of X and Y are in the ratio 8 : 7 and their expenditures are in the ratio 19:16. If each saves Rs. 1250, find their incomes.
26. The students in a class are made to stand in rows. If 3 students are extra in a row, there would be one row less. If three students are less in a row there would be 2 rows more. Find the number of students in the class.
27. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.
28. A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days she has to pay Rs 1000 as hostel charges whereas a student B, who takes food for 26 days, pays Rs 1180 as hostel charges. Find the fixed charges and the cost of food per day.
29. 2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work, and also that taken by 1 man alone.
30. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.

TRIGONOMETRY

1. If $\cot B = \frac{12}{5}$, prove that $\tan^2 B - \sin^2 B = \sin^4 B \sec^2 B$
2. In a Δ ABC, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of $\cos A \cos C = \sin A \sin C$
3. If $\sin\theta = \frac{3}{4}$, prove that $\sqrt{\frac{\operatorname{cosec}^2\theta - \cot^2\theta}{\sec^2\theta - 1}} = \frac{\sqrt{7}}{3}$
4. If $3\tan\theta = 4$, find the value of $\frac{4\cos\theta = \sin\theta}{2\cos\theta + \sin\theta}$
5. If ∠A and ∠B are acute angles such that cos A = cos B, then show that ∠A = ∠B
6. If $x = 30°$, verify that $\cos 3x = 4\cos^3 x - 3\cos x$

7. Find an acute angle θ , when $\frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}=\frac{1-\sqrt{3}}{1+\sqrt{3}}$

8. If 3 $\cos\theta$ = 5 $\sin\theta$, then find the value of $\frac{5\sin\theta-2\sec^3\theta+2\cos\theta}{5\sin\theta+2\sec^3\theta-2\cos\theta}$

9. If sin (A+B) = 1 and cos (A-B) = $\frac{\sqrt{3}}{2}$, 0° < A+B ≤90°, A >B , then find A and B .

10. An equilateral triangle is inscribed in a circle of radius 6 cm . Find its sides .

11. Evaluate: $\frac{\tan^2 60°+4\cos^2 45°+3\sec^2 30°+5\cos^2 90°}{\cos ec30°+\sec 60°-\cot^2 30°}$

12. Evaluate: $\left(\cos ec^2 45°\sec^2 30°\right)\left(\sin^2 30°+4\cot^2 45-\sec^2 60°\right)$

13. Find acute angles A and B , if sin (A+2B) = $\frac{\sqrt{3}}{2}$ and cos(A + 4B) = 0 , A>B.

14. If ΔABC is a right triangle such that ∠C = 90° , ∠A = 45° and BC = 7 units . Find ∠ B , AB and AC.

15. Find the value of x , if tan x = sin 45° cos 45° + sin 30°

16. Find the value of x , if cos 2x = cos 60° cos30° + sin 60°sin 30°

17. Evaluate : cot 12° cot38° cot 52° cot60° cot 78°

18. Prove that tan 20° tan 35° tan 45° tan 55° tan 70° = 1

19. Prove that : $\frac{\sin 70°}{\cos 20°}+\frac{\cos ec20°}{\sec 70°}-2\cos 70°\cos ec20°=0$

20. If A,B,C are the interior angles of a triangle ABC , prove that

$\sin\left(\frac{B+C}{2}\right)=\cos\frac{A}{2}$

21. Prove $\frac{\cos(90°-\theta)\sec(90°-\theta)\tan\theta}{\cos ec(90°-\theta)\sin(90°-\theta)\cot(90°-\theta)}+\frac{\tan(90°-\theta)}{\cot\theta}=2$

22. Prove that:

$\sin(50°+\theta)-\cos(40°-\theta)+\tan 1°\tan 10°\tan 20°\tan 70°\tan 80°\tan 89°=1$

23. If sin 3A = cos(A- 26°) , where 3A is an acute angle , find the value of A

24. If cos 2θ = sin 4θ, where 2θ and 4θ are acute angles , find the value of θ

25. If A + B = 90°, then find the value of $\frac{\tan A\tan B+\tan A\cot B}{\sin A\sec B}-\frac{\sin^2 B}{\cos^2 A}$

26. If $\frac{x\cos ec^2 30°\sec^2 45°}{8\cos^2 45°\sin^2 60°}=\tan^2 60°-\tan^2 30°$, find the value of x.

27. Express cot 85° + cos 75° in terms of trigonometric ratios of angles between 0° and 45°.

28. Prove that sec A (1 – sin A)(sec A + tan A) = 1.

29. Prove that : $\frac{\sin\theta-\cos\theta+1}{\sin\theta+\cos\theta-1}=\frac{1}{\sec\theta-\tan\theta}$

30. Prove that: $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta.\cos ec\theta$

31. Given that $\cos\theta=\frac{m}{n}$, then $\tan\theta$ equal to : (i) $\frac{n}{\sqrt{n^2-m^2}}$ (ii) $\frac{\sqrt{n^2-m^2}}{m}$ (iii) $\frac{\sqrt{n^2-m^2}}{n}$ (iv) $\frac{n}{m}$

32. Evaluate: $\frac{3\cos 55^0}{7\sin 35^0} - \frac{4(\cos 70^0 \cos ec 20^0)}{7(\tan 5^0 \tan 25^0 \tan 45^0 \tan 65^0 \tan 85^0)}$

33. *If* $\tan\theta = \frac{m}{n}$, *Show that* $\frac{m\sin\theta - n\cos\theta}{m\sin\theta + n\cos\theta} = \frac{m^2 - n^2}{m^2 + n^2}$

34. Prove the following identity :

$$\frac{1}{\cos ec\theta - \cot\theta} - \frac{1}{\sin\theta} = \frac{1}{\sin\theta} - \frac{1}{\cos ec\theta + \cot\theta}$$

35. If $\tan\theta + \sin\theta = m$, $\tan\theta - \sin\theta = n$, show that $(m^2 - n^2) = 4\sqrt{mn}$

36. Prove that : $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

37. Prove that : $(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

38. Find the value of $\tan 60^0$ geometrically.

39. If $\cos ec\theta = x + \frac{1}{4x}$, Prove that $\cos ec\theta + \cot\theta$=2x or $\frac{1}{x}$

40. In Δ PQR, right-angled at Q, PR + QR = 25 cm and PQ = 5 cm. Determine the values of sin P, cos P and tan P.

TRIANGLES

1. State and prove Thales theorem.
2. Prove that the ratio of the areas of two similar triangles is equal to the squares of the ratio of their corresponding sides.
3. State and prove Pythagoras theorem.
4. A ladder reaches a window which is 12m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 9m high. Find the width of the street if the length of the ladder is 15m
5. ABCD is a trapezium in which AB || DC and its diagonals intersect each other at the point O. Show that $\frac{AO}{BO} = \frac{CO}{DO}$.
6. D is a point on the side BC of a triangle ABC such that □ ∠ ADC = □ ∠ BAC. Show that CA^2 = CB.CD
7. PQRS is a trapezium with PQ is parallel to SR. Diagonals PR and SQ intersect at M and Δ PMS is similar to Δ QMR. Prove that PS=QR.
8. ABC is an isosceles triangle with AC = BC. If $AB^2 = 2\,AC^2$, prove that ABC is a right angled triangle
9. If a line intersects sides AB and AC of a Δ ABC at D and E respectively and is parallel to BC, prove that $\frac{AD}{AB} = \frac{AE}{AC}$
10. ABCD is a trapezium with AB || DC.E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB. Show that $\frac{AE}{ED} = \frac{BF}{FC}$.
11. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.
12. S and T are points on sides PR and QR of Δ PQR such that ∠ P = ∠ RTS. Show that Δ RPQ ~ Δ RTS.
15. CD and GH are respectively the bisectors of ∠ ACB and ∠ EGF such that D and H lie on sides AB and FE of Δ ABC and Δ EFG respectively. If Δ ABC ~ Δ FEG, show that:
    (i) $\frac{CD}{GH} = \frac{AC}{FG}$ (ii) Δ DCB ~ Δ HGE (iii) Δ DCA ~ Δ HGF
16. The line segment XY is parallel to side AC of Δ ABC and it divides the triangle into two parts of

equal areas. Find the ratio $\frac{AX}{AB}$

17. D, E and F are respectively the mid-points of sides AB, BC and CA of Δ ABC. Find the ratio of the areas of Δ DEF and Δ ABC.
18. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.
19. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.
20. BL and CM are medians of a triangle ABC right angled at A. Prove that $4(BL^2 + CM^2) = 5\,BC^2$.
21. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9\,AD^2 = 7\,AB^2$.
22. ABC is a triangle in which $\angle ABC < 90°$ and $AD \perp BC$. Prove that $AC^2 = AB^2 + BC^2 - 2\,BC \cdot BD$.
23. AD is a median of a triangle ABC and $AM \perp BC$. Prove that :(i) $AC^2 = AD^2 + BC \cdot DM + \left(\frac{BC}{2}\right)^2$

STATISTICS

1. Change the following frequency distribution to less than type distribution and draw its ogive . Hence obtain the median value.

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	15	18	25	11	9	8

2. Calculate the mean marks of the following data using the step deviation method:

Marks	25-35	35-45	45-55	55-65	65-75
Frequency	6	10	8	12	4

3. Find the missing frequency f, if the mode of the given data is 154.

Class	120-130	130-140	140-150	150-160	160-170	170-180
Frequency	2	8	12	f	8	7

4 Find the median of the following data:

Class	0-10	10-20	20-30	30-40	40-50	Total
Frequency	8	16	36	34	6	100

5. If the mean of the following frequency distribution is 54, find the value of p.

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	P	10	9	13

PROBABILITY

1. Savita and Hamida are friends. What is the probability that both will have (i) different birthdays? (ii) the same birthday? (ignoring a leap year).
2. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8? (ii) 13? (iii) less than or equal to 12?
3. It is given that in a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?
4. Five cards—the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.
   (i) What is the probability that the card is the queen?
   (ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?
5. (i) A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective? (ii)Suppose the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn at random from the rest. What is the probability that this bulb is not defective
6. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

7. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?
8. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x.

ARITHMETIC PROGRESSION

1.Find the tenth term of the sequence $\sqrt{2}, \sqrt{8}, \sqrt{18}$ ....
2.Which term of the A.P 3,15,27,39....will be 120 more than its 21st term ?
3.Find sum of all 3 digit numbers which are multiples of 7 .
4.The sum of first 8 terms of an AP is 100 and the sum of its first 19 terms is 551. Find the AP.
5.In an AP, the sum of first n terms is $\frac{3n^2}{2} + \frac{13n}{2}$ .Find the 25th term.
6.The ninth term of an AP is equal to seven times the second term and twelfth term exceeds five times the third term by 2. Find the first term and the common difference
7.The minimum age of children to be eligible to participate in a painting competition is 8 years. It is observed that the age of youngest boy was 8 years and the ages of rest of participants are having a common difference of 4 months.If the sum of ages of all the participants is 168 years, find the age of eldest participant in the painting competition.
8.A sum of Rs.1000 is invested at 8% simple interest per annum. Calculate the interest at the end of 1, 2, 3,....... Years. If the sequences of interests an AP? Find the interest at the end of 30 years
9.The sum of first six terms of an AP is 42. The ratio of its 10th term to its 30th term is 1 : 3.Calculate the first and the thirteenth term of the AP.
10. If the common difference of an AP is 3, then what is $a_{15} - a_9$?
11. Check whether 301 is a term of the list of numbers 5, 11, 17, 23, . . .
12. How many two-digit numbers are divisible by 3?
13. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?
14. How many multiples of 4 lie between 10 and 250?
15. For what value of n, are the nth terms of two APs: 63, 65, 67, . . . and 3, 10, 17, . . . equal?
16.Two APs have the same common difference. The difference between their 100th terms is 100, what is the difference between their 1000th terms?
17. Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.
18. Find the 20th term from the last term of the AP : 3, 8, 13, . . ., 253.
19. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.
20.How many terms of the AP . 24, 21, 18, . . . must be taken so that their sum is 78?
21.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?
22. Find the sum of first 22 terms of an AP in which $d = 7$ and 22nd term is 149.
23.If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.
24. If the sum of the first n terms of an AP is $4n - n^2$, what is the first term (that is S1)? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the nth terms.
25. 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.
26. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row,18 in the row next to it and so on . In how may rows are the 200 logs placed and how many logs are in the top row?
27. In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato,and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato,

runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run?

28. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.

29. The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of the numbers of the houses following it. Find this value of x.

30. Show that $a1, a2, \ldots, a_n, \ldots$ form an AP where a_n is defined as below :

(i) $a_n = 3 + 4n$ (ii) $a_n = 9 - 5n$ .Also find the sum of the first 15 terms in each case.

QUADRATIC EQUATION

1. Solve for x : $a^2 b^2 x^2 + b^2 x - a^2 x - 1 = 0$
2. Solve for x : $\frac{1}{x+3} - \frac{1}{x-6} = \frac{9}{20}$
3. The sum of two numbers is 8. Determine the numbers if the sum of their reciprocal is $\frac{8}{15}$
4. Find the value of p for which the roots of quadratic equation $3x^2 - px + 3$ are real where $p > 0$
5. Solve for x : $6x^2 - \sqrt{2}x - 2 = 0$
6. A train, travelling at a uniform speed for 360 km would have taken 48 minutes less to travel the same distance, if its speed were 5 km/h more. Find the original speed of the train
7. Find the value of k, for which one root of the quadratic equation kx2-14x+8=0 is six times the other
8. If 2 is a root of the equation $x^2 + kx + 12 = 0$ and the equation $x^2 + kx + q = 0$ equal roots, find the value of q.
9. Solve for x : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$
10. A motorboat whose speed in still water is 5km/hr, takes 1 hour more to go 12km upstream than to return downstream to the same spot. Find the speed of the stream.
11. Solve for x: $5^{(x+1)} + 5^{(2-x)} = 5^3 + 1$
12. Find two consecutive positive integers, sum of whose squares is 365.
13. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.
14. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was Rs 90, find the number of articles produced and the cost of each article.
15. Find the roots of the equation $5x2 - 6x - 2 = 0$ by the method of completing the square.
16. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square meters more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m . Find its length and breadth.
17. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.
18. A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?
19. Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48.
20. Is it possible to design a rectangular park of perimeter 80 m and area 400 m^2? If so, find its length and breadth.

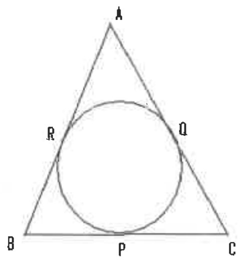
HEIGHTS AND DISTANCE

1. The angle of elevation of the top of the hill at the foot of the tower is 60_ and the angle of elevation of the top of the tower from the foot of the hill is 30 . _ If the tower is 50 m high, then find the height of the hill.
2. From a balloon vertically above a straight road, the angles of depression of two cars on the same side at

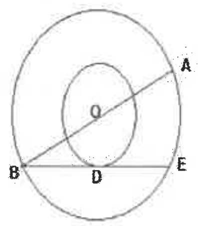
an instant are found to be 45° and 60°. If the cars are 100 m apart, find the height of the balloon
3. The angle of elevation of the top of a vertical tower from a point on the ground is 60°. From another point 10 m vertically above the first, its angle of elevation is 45°. Find the height of the tower
4.From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30°& 45° respectively. Find the distance between the cars. (Use $\sqrt{3}$ =1.73).
5. From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a 20 m high building are 45°& 60° respectively. Find the height of the tower.
6. The angle of elevation of the aeroplane from a point on the ground is 45°. After flying for 15 seconds, the elevation changes to 30° . If the aeroplane is flying at an height of 2500 metres , find the speed of the aeroplane
7. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.
8. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.
9.The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings.
10. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementa f the tower is 6 m.

CIRCLE

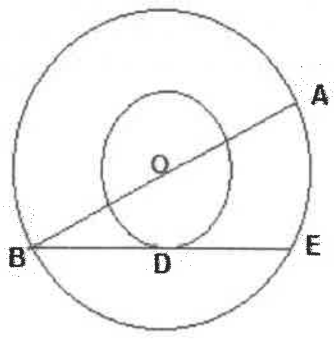
1. In the given figure , the incircle of triangle ABC touches the sides BC, CA and AB at P, Q and R respectively . Prove that (AR + BP + CQ) = (AQ + BR + CP) = ½ (perimeter of triangle ABC) .



2.In the given figure, the radii of two concentric circles are 13 cm and 8 cm. AB is diameter of the bigger circle. BD is the tangent to the smaller circle touching it at D. Find the length AD.



3.Prove that the lengths of the tangents drawn from an external point to a circle are equal. Using the above theorem, prove that AB+CD = AD+BC, if a quadrilateral ABCD is drawn to circumscribe a circle.
4.The lengths of tangents drawn from an external point to a circle are equal.Prove it.
5.Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2 ∠OPQ.
6.Prove that the tangents drawn at the ends of a diameter of a circle are parallel.XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B.Prove that ∠ AOB = 90°.
7.A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively . Find the sides AB and AC.



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

9. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

10. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

11. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

12. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.

13. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle

14. Prove that the parallelogram circumscribing a circle is a rhombus.

15. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively Find the sides AB and AC.

16. XY and $X'Y'$ □are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and $X'Y'$ at B. Prove that □□□□ $\angle AOB = 90°$.

17. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

CONSTRUCTION

1. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

2. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{5}{3}$ of the corresponding sides of the triangle ABC

3. Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

4. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.

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

6. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

SYLLABUS FOR PERIODIC ASSESSMENT –II

REAL NUMBERS, POLYNOMIALS ,LINEAR EQUATION IN TWO VARIABLES, TRIANGLES, TRIGONOMETRY, STATISTICS AND PROBABILITY, QUADRATIC EQUATION, A.P, CIRCLES, CONSTRUCTIONS, HEIGHT AND DISTANCE