DELHI PUBLIC SCHOOL, DURGAPUR

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

CLASS-IX

SUB:MATHEMATICS

NUMBER SYSTEM

1. If $\frac{1}{7} = 0.142857$, find the values of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}$ and $\frac{5}{7}$
2. Visualize 3.765 on the number line using successive magnification.
3. Express $5.0\overline{647}$ in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$
4. Find one rational and one irrational numbers between ·157 and ·167
5. Locate $\sqrt{5}$, $\sqrt{6}$ and $\sqrt{7}$ on the number line
6. Locate $\sqrt{4.5}$ on the number line
7. Rationalize the denominator i) $\frac{2}{2-\sqrt{3}}$ ii) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ iii) $\frac{5}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$
8. Find the values of a and b in each of the following
9. Find the values of a and b if : $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + b\sqrt{5}$
10. If $a = 7 - 4\sqrt{3}$, then find the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$
11. If $x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$, find the value of $x^2 + y^2 + xy$
12. Simplify :) $\frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}} - \frac{3\sqrt{3}}{\sqrt{5}+\sqrt{2}} + \frac{2\sqrt{2}}{\sqrt{3}+\sqrt{5}}$
13. If $x > y$ prove that, $\sqrt{y + \sqrt{2xy - x^2}} + \sqrt{y - \sqrt{2xy - x^2}} = \sqrt{2x}$
14. Solve: $x^{-3} + x^{-\frac{3}{2}} = 2$
15. Write the following numbers in descending order: $\sqrt{2}$, 3.5, $\sqrt{10}$, $-\frac{5}{\sqrt{2}}$, $\frac{5}{2}\sqrt{3}$.

POLYNOMIALS

16. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $(x+1)$ leaves the remainder
19. Find the value of a. Also find the remainder, when p(x) is divided by $x + 2$.
17. Find the zeros of polynomial $6x^3 - 7x^2 - 11x + 12$, if $x-1$ is a factor of the polynomial
18. The polynomials $(ax^3 + 3x^2 - 3)$ and $(2x^3 - 5x + a)$ when divided by $(x-4)$ leave the sam remainder. Find the value of a
19 Find the values of a and b so that $(x + 1)$ and $(x - 1)$ are factors of $x^4 + ax^3 - 3x^2 + 2x + b$
20. Without actual division show that $(x^3 - 3x^2 - 13x + 15)$ is exactly divisible by $(x^2 + 2x - 3)$
21. If $a + b = 4$, and $ab = -12$, find i) $a - b$ ii) $a^2 - b^2$
22. If $a + b + c = 7$ and $ab + bc + ca = 20$, find the value of $a^2 + b^2 + c^2$
23. Find the value of $x^3 + y^3 - 12xy + 64$, when $x+y = -4$
24. Find the value of $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$
25. Multiply : $x^2 + 4y^2 + 2xy - 3x + 6y + 9$ by $x - 2y + 3$
26. Find the value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$, when $a+b+c=3x$
27. Find the value of $64x^3 + 125x^3$, if $4x + 5z = 19$ and $xz = 5$
28 If $x + \frac{1}{x} = 2$ prove that $x^2 + \frac{1}{x^2} = x^3 + \frac{1}{x^3} = x^4 + \frac{1}{x^4}$
29. If $x^2 - 3x + 1 = 0$, find i) $x^2 + \frac{1}{x^2}$, and ii) $x^3 + \frac{1}{x^3}$

30.**FACTORIZE**:

(1) $(ax+by)^2+(bx-ay)^2$ (2) $a^3x+a^2(x-y)-a(y+z)-z$. (3) x^4+4

(4) $2(ab+cd)-a^2-b^2+c^2+d^2$ (5) $(1-x^2)(1-y^2)+4xy$ (6) $x^4+y^4-11x^2y^2$

(7) $7\sqrt{2}x^2-10x-4\sqrt{2}$ (8) x^8-y^8 (9) $9(x-2y)^2-4(x-2y)-13$

(10) $(x+1)^3-(x-1)^3$ (11) $x^{12}-y^{12}$ (12) $x^3-12x(x-4)-64$

(13) $(x+y)^3-(x-y)^3-6y(x^2-y^2)$ (14) $a^3x^3-3a^2bx^2+3ab^2x-b^3$ (15) $8x^3+27y^3+36x^2y+54xy^2$

(16) $5\sqrt{5}x^2+20x+3\sqrt{5}$ (17) $x^2-2\sqrt{2}x-30$ (17) x^6-7x^3- (18) $1029-3x^3$

(19) $125+8x^3-27y^3+90xy$ (20) $(2x-3y)^3+(4z-2x)^3+(3y-4z)^3$

(21) $2\sqrt{2}a^3+3\sqrt{3}b^3+c^3-3\sqrt{6}abc$ (22) $p^3(q-r)^3+q^3(r-p)^3+r^3(p-q)^3$

(23) $(x-3y)^3+(3y-7z)^3+(7z-x)^3$ (24) $7\sqrt{2}x^2-10x-4\sqrt{2}$ (25) $2\sqrt{2}a^3+8b^3-27c^3+18\sqrt{2}abc$

31.Find the value of $\left(\sqrt{32}-\sqrt{5}\right)^{\frac{1}{3}}\left(\sqrt{32}+\sqrt{5}\right)^{\frac{1}{3}}$

32.If $2^x=3^y=12^z$, prove that $x=\frac{2yz}{y-z}$ 33.Simplify: $\frac{5^{n+3}-6\times5^{n+1}}{9\times5^n-2^2\times5^n}$

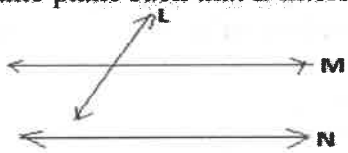
INTRODUCTION TO EUCLID'S GEOMETRY

1.A point C lies between two points A and B such that AC = CB. Prove that $AC=\frac{1}{2}AB$.

2.Prove that every line segment has a unique mid-point.

3.In the given figure AC = BD. Prove that AB = CD.

4.L,M,N are three lines in the same plane such that L intersects M and M is parallel to N.



Show that L intersects N also.

ANGLES AND LINES

1.Through what angle does the minute hand of a clock turn between 6 pm and 7 pm

2.Through what angle does the hour hand of a clock turn between 6 pm and 7 pm

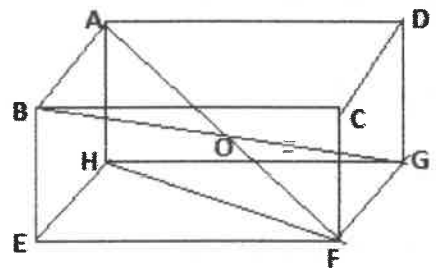
3.It is 12 o'clock midday. The minute hand turns through 270^0. What is the time now?

4.Find the complement of the angle i) 58^0 ii) $68^0\ 35'45''$ iii) one twelfth of four right angles

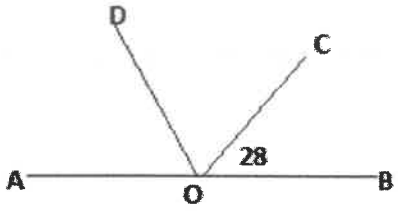
5. Find the supplement of the angle i) $124^0\ 20'$ ii) two third of a straight angle

6.What angle is i) its own complement ii) its own supplement iii) one third of its complement iii) three times its supplement.

7.. The figure represents a cuboid. What is the size of $\angle AHE$ and of $\angle AHG$? Name the complement of $\angle EFH$, and the supplement of $\angle GOF$. Name a pair of adjacent angles. Name a pair of vertically opposite angles.



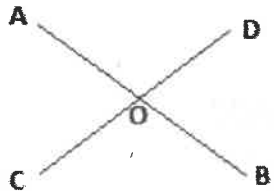
7. AOB is a straight line $\angle AOD=\angle DOC$. Find the size of each.



8. If bisectors of two adjacent angles be at right angles, the exterior arms of the angles are in a straight line.

9.In the given figure find the other angles if

(i) $\angle AOC = 42^0$



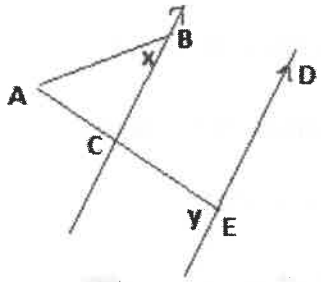
(ii) $\angle AOC + \angle BOD = 76^0$ (iii) $\angle AOC + \angle BOC + \angle BOD = 224^0$.

10. The straight lines OC and AB meet at O and $\angle AOC = \angle COB$. The straight line OD makes $\angle COD = 15^0$ What is the difference between $\angle AOD$ and $\angle DOB$? What is the sum?

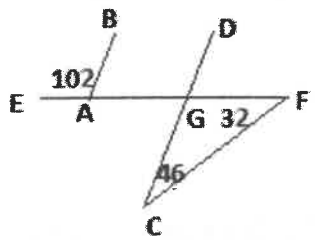
11. $\angle AOB = 42^0$ and AO is produced to C. $\angle BOC$ is bisected by OD. Find the size of the reflex angle $\angle AOD$

12.OA, OB, OC, OD are four straight angles in order such that $\angle AOC = \angle BOD = 90^0$ .If $\angle BOC = x^0$, calculate the size of $\angle AOD$ .If AO is produced to E , find the size of $\angle DOE$

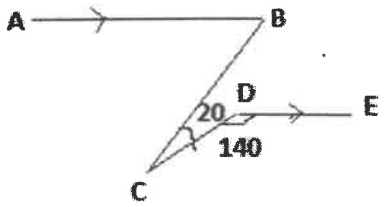
13 . CB and ED are parallel. Find angle A in terms of x and y.



14. In the given diagram prove that AB is parallel to CD

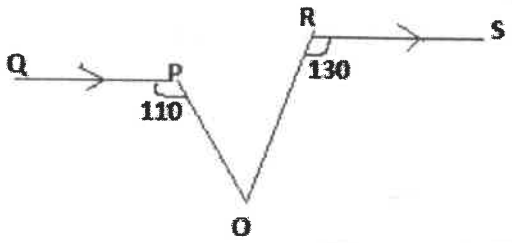


15.AB is parallel to DE. Find $\angle ABC$.



16.If the bisectors of a pair of alternate angles formed by a transversal with two given lines are parallel to each other, prove that the lines are parallel.

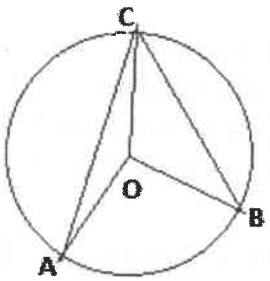
17. Determine $\angle POR$ if QP is parallel to RS.



18.. Prove that $\angle ABC + \angle BCD = 180^0 + \angle CDE$, Given AB is parallel to DE.

CONGRUENCE OF TRIANGLES AND INEQUALITIES IN A TRIANGLE

1. O is the centre of a circle , $\angle OCA = 20^0$ and $\angle OCB = 30^0$ Calculate $\angle AOB$.



2.ABCDEF is a regular hexagon. Show that triangle ACE is an equilateral triangle.

3.If the straight line joining the middle points of two opposite sides of a quadrilateral be at right angles to these sides, the other two sides are equal

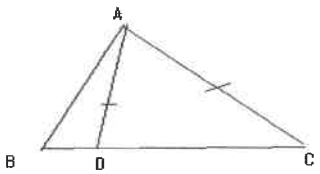
4. If $\Delta BCP, \Delta CAQ, \Delta ABR$ be equilateral triangles described externally on the sides of the triangle ΔABC , show that AP = BQ = CR.

5. Squares ABDE and ACFH are drawn on the sides AB and AC of any triangle ΔABC and externally to it. Prove that BH = CE

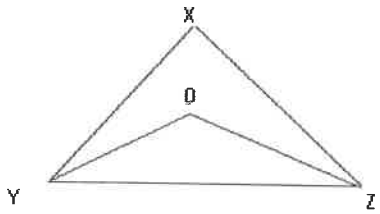
6. $\Delta ABC, \Delta DBC$ are two isosceles triangles drawn on the same base BC, prove that $\angle ABD = \angle ACD$

7.If the median AD of the ΔABC is equal to half BC, prove that $\angle BAC = \angle B + \angle C$

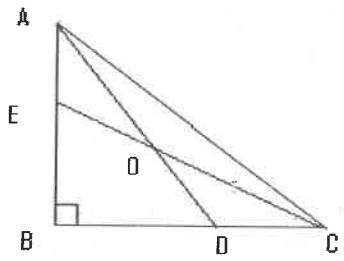
8. In the figure , D is a point on side BC of Δ ABC such that AD = AC . Show that AB> AD



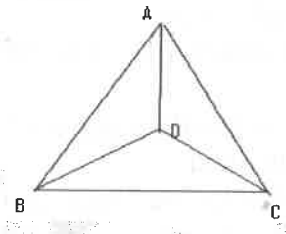
9. In the figure $\angle X = 72°$, $\angle XZY = 46°$. If YO and ZO are bisectors of $\angle$ XYZ and $\angle$ XZY respectively of ΔXYZ, find $\angle OYZ$ and $\angle YOZ$.



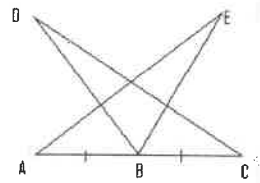
10. In the figure , AD and CE are angle bisectors of $\angle A$ and $\angle C$ respectively . If $\angle ABC = 90°$, then find $\angle AOC$.



11. In the given figure, AB = AC , D is a point in the interior of ΔABC such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of ΔABC.



12 In the following figure, AB = BC , $\angle A = \angle C$ and $\angle ABD = \angle CBE$. Prove that CD = AE.



13. A point P is take within a square ABCD such that PA = PC; Prove that B, P, D are collinear.
14. ABCD is a square. A is joined to the point X in DC and D to the point Y in CB so that AX = DY. Prove that AX is perpendicular to DY
15. ABC is a triangle with D the midpoint of BC. DE and DH are drawn perpendicular to AB and AC respectively. If DE = DH prove that
    i) BE = CH
    ii) AE = AH, and hence prove that triangle ABC is isosceles.
16. In triangle ABC, sides AB and AC are produced to D and E respectively and the exterior angles DBC and ECB are bisected by straight lines meeting at R. From R perpendiculars are drawn to BD, to BC and to CE. Prove that these perpendiculars are equal.
17. Show that the sum of the three altitude of a triangle is less than the sum of the three sides of the triangle.
18. Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.
19. Prove that the perimeter of a triangle is greater than the sum of its three medians.
20. In triangle ABC, AB = AC, AD is perpendicular to BC and is produced to any point Y. A straight line YZX cuts AB at Z, and CA produced, at X. Prove that $BY + YX > BA + AX$
21. The perpendiculars from B and C to the opposite sides of a triangle ABC intersect in X inside the triangle. If $AB > AC$, prove that $BX > CX$.
22. AB = AC in the isosceles triangle ABC. Any straight line cuts AB, AC and BC produced in P, Q and R respectively. Prove that $AQ < AR$
23. The interior bisector of $\angle A$ and the exterior bisector of $\angle B$ of triangle ABC meet at P, and AP cuts BC in Q, prove that PQ>BQ.

AREA OF A TRIANGLE AND QUADRILATERAL

24. Each of equal sides of an isosceles triangle is 2 cm greater than its height. If the base of the triangle is 12 cm, find the area of the triangle.

25. If the area of an isosceles triangle is 120 cm^2 and the length of its equal sides is 17 cm, find its base.

26 The sides of a triangle are in the ratio13:14:15 and its perimeter is 84cm. Find the area of the triangle

27.A point O is taken inside an equilateral triangle ABC. If OL is perpendicular to BC, OM is perpendicular to AC, and ON is perpendicular to AB such that OL = 14cm, OM = 10cm and ON = 6cm, find the area of the triangle ABC

28 Find the area of a quadrilateral ABCD whose sides are 9m, 40m, 28m and15m respectively and the angle between the first two sides is a right angle.

29. Find the area of a quadrilateral ABCD, in which AB = 7cm, BC = 6cm, CD = 12cm, DA = 15cm and AC = 9cm

30. A field is in the shape of a trapezium whose parallel sides are 25m and 10m. The non-parallel sides are 14m and 13m. Find the area of the field.

31. Find the area of a trapezium whose parallel sides are 25cm, 13cm and other sides are15cm each.

32. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30m and its longer diagonal is 48m, how much area of grass field will each cow be grazing?

LINEAR EQUATION IN TWO VARIABLES

33. Express each of the following equations in the form of $ax+by+c=0$ and write the values of a,b,c.

1) $2x+3y=5$ **2)** $y=9$

34. Write the four solutions of $2x+y=7$

35. Find whether $\left(\sqrt{3},0\right)$ is a solution of $3\sqrt{3}x-3y=9$ or not.

36. If $(5,k)$ is a solution of the linear equation $2x+y-6=0$ then find the value of k.

37. Draw the graph of $2x-3y+12=0$ in a cartesian plane and find the point where graph intersect at y-axis

38. Give the equations of two lines passing through (2, 10). How many more such lines are there and why?

39. Draw a triangle whose sides are represented by x = 0, y = 0 and x + y = 3 in the cartesian system. Also find the coordinates of its vertices.

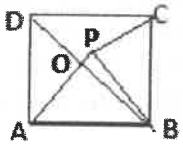
40.Draw the graph of the following equations on the same graph sheet. $x-y=0, x+y=0, x=2$ .Also find the area enclosed between these lines.

41. Ankita decided to cook some soup for the patients on her birthday. The soup bowls are cuboidal in shape, length and breadth of the bowl are given by (x + 2) and (x-3) and volume is given by $2x^3+ax^2-bx+8$,

i) Find the values of a,b ii) What value is depicted by Ankita?

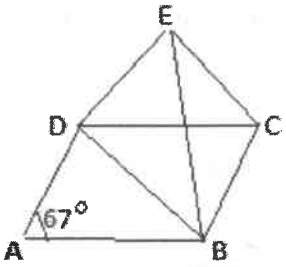
QUADRILATERAL &PARALLELOGRAM

1.The given figure shows a square and an equilateral triangle ABP. Calculate: i) $\angle AOB$ ii)



$\angle BPC$ iii) $\angle PCD$ and iii) reflex $\angle APC$

2. In the given figure, ABCD is a rhombus with angle A = 67^0. If DEC is an equilateral triangle, calculate $\angle CBE$ and $\angle DBE$

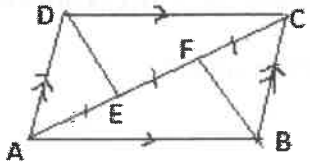


3. The angles of a quadrilateral are in the ratio 3:4:5:6. Show that the quadrilateral is a trapezium.

4. A transversal cuts two parallel lines at A and B. The two interior angles at A are bisected and so are two interior angles at B; The four bisectors form a quadrilateral ACBD. Prove that :
i) ACBD is a rectangle.
ii) CD is parallel to the original parallel lin.

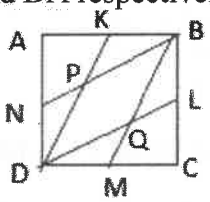
5. ABCD is a rhombus. RABS is a straight line such that RA = AB = BS. Prove that RD and SC when produced meet at right angle.

6. The figure shows a parallelogram ABCD in which AE = EF = FC. Prove that: i) DE is parallel to FB ii) DE = FB, and



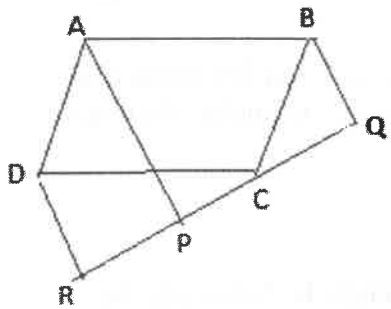
iii) DEBF is a parallelogram.

8. K, L, M, N are the midpoints of the sides AB, BC, CD and DA respectively of a square ABCD. Prove that BM, BN, DK, DL enclose a rhombus.

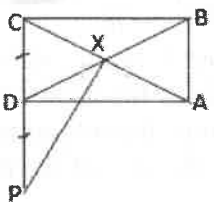


9. Prove that the sum of the perpendiculars drawn from any point in the base of an isosceles triangle to the equal sides, is equal to the perpendicular from either extremity of the base to the opposite side.

10. ABCD is a parallelogram. Through C a straight line RQ is drawn outside the parallelogram and AP, BQ, DR are drawn perpendicular to RQ. Show that DR + BQ = AP



11. ABCD is a rectangle and AC = 2AB. Prove that
i) PX is perpendicular to CA



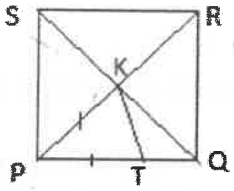
ii) XP = AD

12. P is the mid-point of the side AC of triangle ABC. BP is produced its own length to D. Prove that ABCD is a parallelogram. Q is the mid-point of AB and CQ is produced its own length to E. Prove that

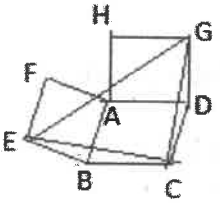
i) EAD is a straight line.

ii) ED = 2BC

13. PQRS is a square. PK = PT. Prove that $\angle PKT = 3\angle TKQ$

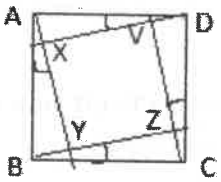


14. ABCD is a parallelogram. ABEF and ADGH are squares. Prove that ΔCGE is isosceles.

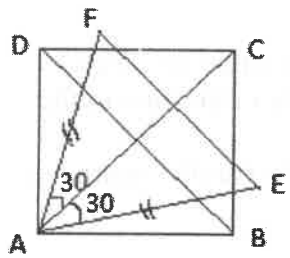


15.ABCD is a rhombus, whose diagonals intersect in O. AR is drawn parallel to BD. If OR cuts AD in K, prove that AB = 2OK.

16. ABCD is a square, prove that VXYZ is also a square.



17 ABCD is a square, Prove that EF is parallel to BD.



18. ABC is a triangle, and through A, B, C lines are drawn parallel to BC, CA and AB respectively intersecting at P, Q and R, Prove that perimeter of triangle PQR is double the perimeter of triangle ABC

INTERCEPT THEOREM AND MIDPOINT THEOREM

19. State and prove Midpoint Theorem.

20. In a triangle ABC, AD is drawn perpendicular to the bisector of the angle B. Show that the straight line drawn through D parallel to BC bisects AC.

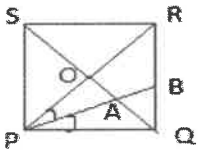
21. In any triangle ABC, if BE, CF be perpendiculars on any straight line through A, and D be the middle point of BC. Show that DE = DF.

22. Prove that the straight line joining the mid-points of the diagonals of a trapezium is parallel to the parallel sides and is equal to one half of the difference of those sides.

23.Prove that the straight line that joins the midpoints of the oblique sides of a trapezium is parallel to parallel sides and is equal to half the sum of the parallel sides.

24. ABCD is a parallelogram and XY is any line outside the parallelogram. AP, BQ, CR and DS are perpendiculars from A, B, C, D to XY. Prove that AP + CR = BQ + DS

25. PQRS is a square.



Angle OPA = Angle APQ. Prove that OA = 1/2 RB

26. Prove that the medians of a triangle are concurrent, and the point of concurrence is point of trisection of each median.

27. AD is a median of triangle ABC. BX and CY are drawn parallel to AD and meeting BX and CY in G and H respectively. Prove that AG = AH.

28. In a triangle ABC, AD is the median through A and E is the midpoint of AD. BE produced meets AC in F. Prove that AF = 1/3 AC

29. Show that quadrilateral formed by joining the midpoints of the consecutive sides of a rectangle is a rhombus.

30. Show that the quadrilateral, formed by joining the midpoints of the sides of a square, is also a square.

31. ABCD is a parallelogram. E and F are midpoints of the sides AB and CD respectively. prove that the line segment AF and CE trisect the diagonal BD.

SYLLABUS FOR PERIODIC ASSESSMENT II

NUMBER SYSTEM,POLYNOMIALS,EUCLIDS GEOMETRY,LINES AND ANGLES,TRIANGLES,COORDINATE GEOMETRY,LINEAR EQUATION IN TWO VARIABLES,HERONS FORMULAE,QUADRILATERAL