RATIONAL NUMBERS

1. Find five rational numbers between i) $\dfrac{2}{3}$ and $\dfrac{4}{5}$ ii) $\dfrac{-3}{2}$ and $\dfrac{5}{3}$ iii) $\dfrac{1}{4}$ and $\dfrac{1}{2}$ iv) -1 and 0

2. Represents the following numbers on the number line $a)\dfrac{-1}{4}, b)-1\dfrac{1}{5}, c)-3\dfrac{5}{8}, d)\dfrac{-7}{10}, e)-5\dfrac{3}{5}$

3. Using property solve the following:

   i) $-\dfrac{13}{20}+\dfrac{-5}{7}+\dfrac{11}{14}+\dfrac{7}{10}$ ii) $\dfrac{3}{5}$

4. Write: (i)The rational number that does not have a reciprocal.
   (ii)The rational numbers that are equal to their reciprocals.
   (iii)The rational number that is equal to its negative.

7. A tin holds $16\dfrac{1}{2}$ litres of oil. How many such tins will be required to hold $313\dfrac{1}{2}$ litres of oil?

8. Salma bought $2\dfrac{1}{2}$ kg onions at Rs 12/kg and $1\dfrac{3}{8}$ kg tomatoes at Rs $16\dfrac{8}{11}$ /kg.How much money did she give to the shopkeeper?

9. The product of two rational numbers $\dfrac{-16}{9}$ .If one of the numbers is $\dfrac{-4}{3}$,find the other.

10. Divide the sum of $\dfrac{13}{5}$ and $\dfrac{-12}{7}$ by the product of $\dfrac{-31}{7}$ and $\dfrac{-1}{2}$.

11. If $\dfrac{3}{5}$ of a number exceeds its $\dfrac{2}{7}$ by 44, find the number.

12. Rita had Rs 300.She spend $\dfrac{1}{3}$ of her money on notebooks and $\dfrac{1}{4}$ of the reminder on house rent .How much money is left with her?

EXPONENTS

1. Simplify:

(i) $(\dfrac{1}{2})^{-2}+(\dfrac{1}{3})^{-2}+(\dfrac{1}{4})^{-2}$ (ii) $(2^0+3^{-1})\times 3^2$ (iii) $\{(\dfrac{1}{3})^{-3}-(\dfrac{1}{2})^{-3}\}\div(\dfrac{1}{4})^{-3}$ (iv)

$\{(\dfrac{2}{3})^2\}^3\times(\dfrac{1}{3})^{-4}\times 3^{-1}\times 6^{-1}$

(v) $(3^2-2^2)\times(\dfrac{2}{3})^3$ (vi) $\{(\dfrac{1}{2})^{-1}\times(-4)^{-1}\}^{-1}$ (vii) $[\{(\dfrac{-1}{4})^2\}^{-2}]^{-1}$

2. Find the value of x:

(i)$(\dfrac{3}{2})^{-3}\times(\dfrac{3}{2})^5=(\dfrac{3}{2})^{2x+1}$ (ii) $(\dfrac{8}{3})^{2x+1}\times(\dfrac{8}{3})^5=(\dfrac{8}{3})^{x+2}$

3. If x$=(\dfrac{3}{2})^2\times(\dfrac{2}{3})^{-4}$ then find x^{-2}.

4. If x$=(\dfrac{4}{5})^{-2}\div(\dfrac{1}{4})^2$ then find x^{-2}.

5. Simplify: $(a+b+c)(a^{-1}+b^{-1}+c^{-1})-a^{-1}b^{-1}c^{-1}(b+c)(c+a)(a+b)$

6. simplify : $\dfrac{\left(p+\dfrac{1}{q}\right)^m \left(p-\dfrac{1}{q}\right)^m}{\left(q+\dfrac{1}{P}\right)^m \left(q-\dfrac{1}{p}\right)^m}$

7. Show that : $\dfrac{1}{1+x^{m-n}+x^{m-p}}+\dfrac{1}{1+x^{n-m}+x^{n-p}}+\dfrac{1}{1+x^{p-m}+x^{p-n}}=1$

8. If $a^b = b^a$, show that $\left(\dfrac{a}{b}\right)^{\frac{a}{b}} = a^{\frac{a}{b}-1}$, and if a = 2b, show that b = 2

9. Show that $\left(\dfrac{x^l}{x^m}\right)^{l^2+lm+m^2} \times \left(\dfrac{x^m}{x^n}\right)^{m^2+mn+n^2} \times \left(\dfrac{x^n}{x^l}\right)^{n^2+ln+n^2} = 1$

10. If $\dfrac{9^n.3^2.3^n-(27)^n}{3^{3m}2^3}=\dfrac{1}{27}$, prove that m = 1+n

11. If $\dfrac{4^{n+1}.2^n-8^n}{2^{3m}}=\dfrac{3}{8}$, prove that n + 1 = m

12. By what number should $(\dfrac{-2}{3})^{-3}$ be divided so that the quotient may be $(\dfrac{4}{27})^{-2}$?

13. Write each of the following numbers in standard form:
   i)3500000 ii)4630000000000 iii)345×10⁵ iv)0.0000000165 v)0.0000000689
14. Write each of the following numbers in usual form:
   i)2.06×10⁻⁵ ii)6.82×10⁻⁶ iii)4.129×10⁻³ iv)1.679×10⁹ v)6.912×10⁸

ALGEBRAIC EXPRESSION

1. Find the following products:
i)(7x - 4y) × (3x - 7y) (ii)(3x²+5x-9)×(3x-5) (iii)(x²-5x+8)×(x²+2x-3)
(iv)(2x²+3x+7)×(3x²-5x+4) (v)(9x²-x+15)(x²-x-1)
2. Write the quotient and remainder when we divide:
i)(14x²-53x+45) by(x-2)   (ii)(x³+1)(x+1) (iii)(5x³-12x²+12x+13) by(x²-3x+4)
(iv)(8x⁴+10x³-5x²-4x+1) by(2x²+x-1)

3. Using suitable identity find $(7x - 3y)^2$.
4. Simplify 3a(4a - 5) + 3 and find its value for a = 3.
5. Using suitable identity find the value of the following:
 i) 105 × 107 ii) 297 × 303 iii) 501 × 502 iv) 95 × 103 v)10.5×9.5
6. Using identity find the value of i)(7.2)² ii) (4.7)² iii)(98)² iv)(103)²
7. Simplify $(xy + yz)^2 - 2x^2y^2z$. Find the value when x = -1, y = 1 and z = 2.
8. Simplify: i) (1.5x − 4y)(1.5x + 4y +3) − 4.5x +12y
9. If $x^2+\dfrac{1}{x^2}=27$, find $x+\dfrac{1}{x}$ and $x-\dfrac{1}{x}$.
10. If $x-\dfrac{1}{x}=3$ find $x^2+\dfrac{1}{x^2}$ and $x^4+\dfrac{1}{x^4}$
11. If ab=6 and a+b=5 find (a^2+b^2)
12. If a-b=7 and ab=9 ,then find the value of (a^2+b^2)
13. If $(x+\dfrac{1}{x})=5$ then find the value of $(x^2+\dfrac{1}{x^2})$ and $(x^4+\dfrac{1}{x^4})$.
14. 2a +3b = 7 and ab = 2, find 4a² +9b²
15. If a + b = 8 and a − b = 2 , find the value of 2a² + 2b²
16. If $x-\dfrac{1}{x}=\sqrt{5}$, find the values of $2\left(x^2+\dfrac{1}{x^2}\right)$

17. Find the value of the expression $(81x^2 + 16y^2 - 72xy)$, when $x = \dfrac{2}{3}, y = \dfrac{3}{4}$

18. Find the value of $a^2 b^2 - 12abc + 36c^2$, when $a = 4$, $b = 7$ and $c = 5$

19. If $\left(x + \dfrac{1}{x}\right)^2 = 13$, find $x^4 + \dfrac{1}{x^4}$

20. Prove that :i) $(9p - 5q)^2 + 180pq = (9p + 5q)^2$

    (ii) $(a - b)(a + b) + (b - c)(b + c) + (c - a)(c + a) = 0$

    (iii) $(3x + 7)^2 - 84x = (3x - 7)^2$

    (iv) $(4pq + 3q)^2 - (4pq - 3q)^2 = 48pq^2$

21. Simplify:

i) $(x^3 - 2x^2 + 3x - 4)(x - 1) - (2x - 3)(x^2 - x + 1)$ ii) $(x^2 - 3x + 2)(5x - 2) - (3x^2 + 4x - 5)(2x - 1)$.

22. What must be added to $3x^2 - 5xy + 6y^2 + 7yz$ in order that the sum may be $-x^2 - y^2 - yz$

23. What must be subtracted from $5x^2 - 6xy + 4y^2 - 8x - 10y + 15$ in order that the remainder may be $x^2 + 2xy + 3y^2 + 4x + 5y + 6$.

24. What must be added to $9x^2 - 24x + 10$ to make it a perfect square?

25. If $x^2 + y^2 = 29$ and $xy = 2$, find the value of (i) $x + y$ (ii) $x - y$ (iii) $x^4 + y^4$

DATA HANDLING

1. The weekly wages (in Rs) of 30 workers in a factory are.

830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890, 806, 840

Using tally marks make a frequency table with intervals as 800–810, 810–820 and so on. Draw a histogram for the frequency table and answer the following questions.

    (i) Which group has the maximum number of workers?

    (ii) How many workers earn Rs 850 and more?

    (iii) How many workers earn less than Rs 850?

2. On a particular day, the sales (in rupees) of different items of a baker's shop are given

ordinary bread	:	320
fruit bread	:	80
cakes and pastries	:	160
biscuits	:	120
others	:	40
Total	**:**	**720**

below .

Draw a pie chart for this data.

3. The following table shows the percentages of buyers of four different brands of soaps. Represent the data by a pie chart

Brands	A	B	C	D
Percentage of Buyers	20%	40%	25%	15%

4. The following table shows the life expectancy in various countries in a particular year. Represent the data by a bar graph.

Country	Japan	India	Britain	Ethiopia	Cambodia
Life expectancy(in years)	76	57	70	43	36

5. There are 216 workers in a factory as per list given below: Represent the following data by a pie chart.

Cadre	labour	Mechanic	Fitter	Supervisor	Clerk
No of workers	75	60	36	27	18

6. Below pie chart gives the expenditure (in percentage) on various items and savings of a family during a month.

    (i) On which item, the expenditure was maximum?

(ii) Expenditure on which item is equal to the total savings of the family?

(iii) If the monthly savings of the family is Rs 3000, what is the monthly expenditure on clothes?
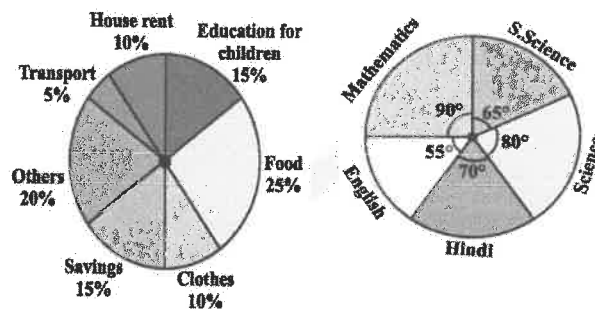

7. The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the student was 540, answer the following questions.

i) In which subject did the student score 105 marks?

ii) How many more marks were obtained by the student in Mathematics than in Hindi?

iii) Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi.

POLYGON, QUADRILATERAL

1. How many diagonals does each of the following have?
   (a) A convex quadrilateral (b) A regular hexagon (c) A triangle

2. Find the angle measure x in the figures.
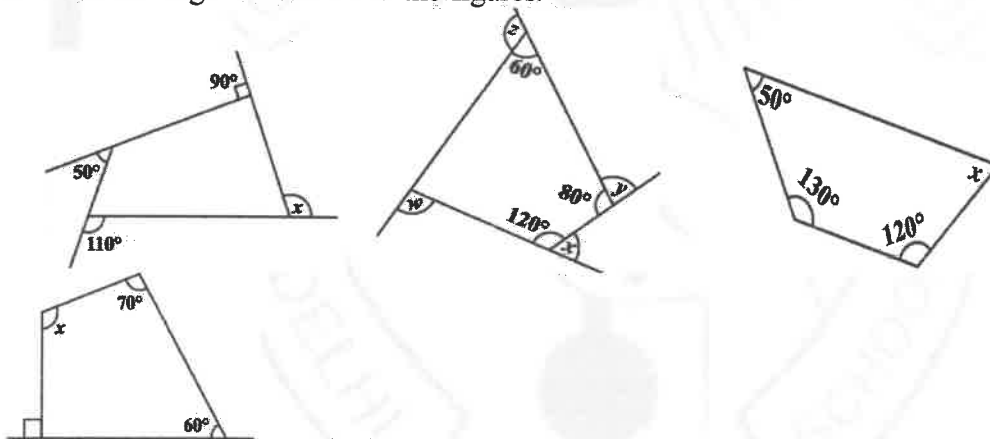
3. Find the number of sides of a regular polygon whose each exterior angle has a measure of 45°.

4. Find the measure of each exterior angle of a regular polygon of (i) 9 sides (ii) 15 sides

5. How many sides does a regular polygon have if each of its interior angles is 165°?

6. What is the minimum interior angle possible for a regular polygon? Why?

7. What is the maximum exterior angle possible for a regular polygon?

8. In Fig, BEST is a parallelogram. Find the values x, y and z.
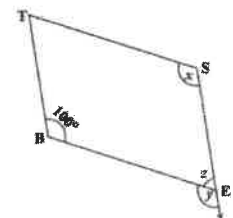
9. In a parallelogram RING, if $m \angle R = 70°$, find all the other angles.

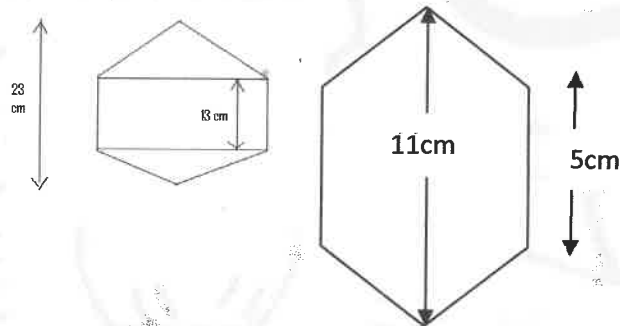10. In Fig HELP is a parallelogram. (Lengths are in cms). Given that OE = 4 and HL is 5 more than PE? Find OH.
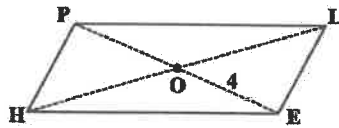
11. RENT is a rectangle. Its diagonals meet at O. Find x, if OR = $2x + 4$ and OT = $3x + 1$.
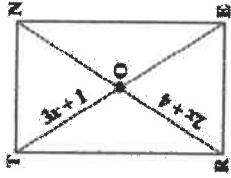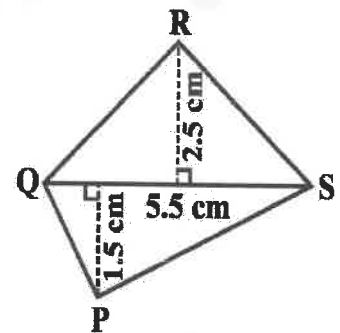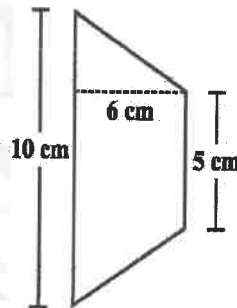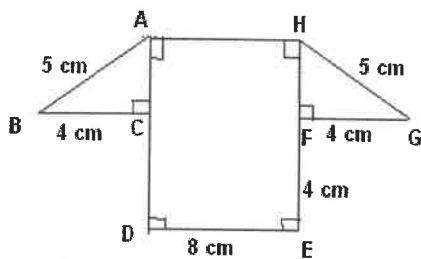
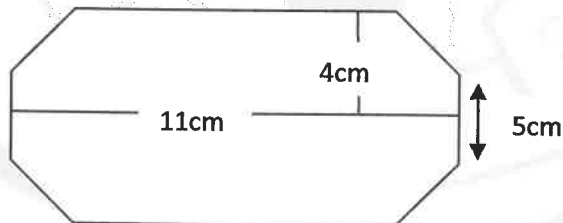**12.** The diagonals of a rhombus are 15 cm and 8 cm. Find its perimeter

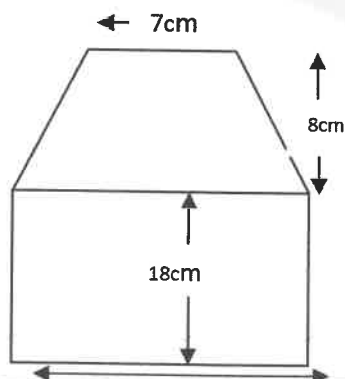## AREA OF A TRAPEZIUM AND A POLYGON

2.i) Find the area of the following diagram:

ii) Find the area of the regular hexagon and regular octagon.

iii)

3. The parallel sides of a trapezium are 60 cm and 80 cm and non parallel sides are 26 cm and 26 cm. Find the area of the trapezium.

4. Length of the fence of a trapezium shaped field ABCD is 120 m. If BC = 48 m, CD = 17 m and AD = 40 m, find the area of this field. Side AB is perpendicular to the parallel sides AD and BC.

5. Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the side along the road. If the area of this field is 10500 m² and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along the river.

LINEAR EQUATION

1. Solve :

i) $\dfrac{5x-11}{4}+\dfrac{3x-7}{2}=\dfrac{4x-7}{3}+x-1$ ii) $x-\dfrac{x-1}{2}=1-\dfrac{x-2}{3}$ iii) $\dfrac{2x-3}{2x-1}=\dfrac{3x-1}{3x+1}$

iv) $\dfrac{2x+9}{x+4}+\dfrac{3x-2}{x-1}=\dfrac{4x+13}{x+3}+\dfrac{x+1}{x}$ v) $\dfrac{4}{5}\left(x+\dfrac{5}{6}\right)-\dfrac{2}{3}\left(x-\dfrac{1}{4}\right)=1\dfrac{1}{9}$ vi) $5x-\dfrac{x+1}{3}=6\left(x+\dfrac{1}{30}\right)$

vii) $\dfrac{x-bc}{a}+\dfrac{x-ca}{b}+\dfrac{x-ab}{c}=2(a+b+c)$

2. Half of a herd of deer are grazing in the field and three fourths of the remaining are playing nearby. The rest 9 are drinking water from the pond. Find the total number of deer in the herd.

3. A positive number is 5 times another number. If 21 is added to both the numbers then one of the new numbers becomes twice of another new numbers. Find the original numbers.

4. Three consecutive natural numbers are such that when they are taken in decreasing order and multiplied by 3, 4, and 5 respectively, they add up to 226. Find these numbers

5. Two years ago, Dalip was three times as old as his son and two years hence, twice his age will be equal to five times that of his son. Find their present ages.

6. The digit in the tens place of a two-digit number is three times that in the units place. If the digits are reversed, the new number will be 36 less than the original number. Find the original number

7. Sum of the digits of a two digit number is 9. When we interchange the digits the new number is 27 greater than the earlier number. Find the number

8. The ages of A and B are in the ratio 5:7. Four years from now the ratio of their ages will 3: 4. Find their present ages.

9. The numerator of a fraction is 7 less than the denominator. If the numerator is increased by 2 and the denominator by 9, we again get the same fraction. Find the fraction.

10. A has only 10 paise and 25 paise in his purse. If in all he has 60 coins worth Rs. 8.25, how many coins of each denomination does he have ?

11. The distance between two stations is 425km. Two trains start simultaneously from these stations on parallel tracks to cross each other. The speed of one of them is greater than that of the other by 5km/h. If the distance between the two trains after 3h of their start is 20km, find the speed of each train.

12. A streamer goes downstream from point A to B in 9hrs. From B to A, upstream, it takes 10h. If the speed of the stream is 1km/hr, what will be the speed of streamer in still water? Also find distance between the points A and B.

FACTORISATION

Factorize:

(1) x^4-625 (2) x^4-81 (3) $x^4-(y+z)^4$ (4) $x^2-21x+108$ (5) $6x^2+11x-10$ (6) $(x^2-2xy+y^2)-z^2$

(7) $5(3x+y)^2+6(3x+y)-8$ (8) $3x^4-14x^2+8$ (9) $5x^2yz-5x^3y$ (10) $18q^2+338p^2-156pq$

(11) $4a^2-9b^2-c^2-6bc$ (12) $25(x+2y)^2-36(2x-5y)^2$ (13) $15x^2+13x+2$ (14) $6x^2-13x+5$

(15) $m^4 - 256$ (16)$(a^4 - 2a^2b^2 + b^4)$ (17) $(x^2 - 2xy + y^2) - z^2$ (18) $a^2 - 4b^2 + 28bc - 49c^2$
(19) $5y^2 - 20y - 8z + 2yz$ (20) $a^8 - b^8$ (21) $ab(x^2 + y^2) - xy(a^2 + b^2)$ (22) $a - b - a^2 + b^2$

COMPOUND INTERST

1. The simple interest on a sum of money for 2 years at 8% per annum is Rs 2400 . What will be the compound interest on that sum at the same rate and for the same period ?

2. In what time will Rs 1000 amount to Rs 1331 at 10% per annum , compounded annually?

3. The difference between the compound interest and simple interest on a certain sum of money at $6\frac{2}{3}\%$ per annum for 3 years is Rs. 46. Find the sum when the interest is compounded annually.
What is the rate of interest percent per annum?

4. At what rate percent per annum will a sum of Rs. 7500 amount to Rs. 8427 in 2 years compounded annually?

5. Find the compound interest on Rs. 320000 for one year at the rate of 20% per annum, if the interest is compounded quarterly.

6. 24000 blood donors were registered with a charitable hospital. The number of donors increased at the rate of 5% every six month. Find the time period at the end of which the total number of blood donors becomes 27783.

7. The value of a property increases every year at the rate of 5%. If its value at the end of 3 years be Rs. 411540, what was its original value at the beginning of these years?

SYLLABUS PERIODIC ASSESSMENT II

RATIONAL NUMBER, EXPONENT, COMPOUND INTEREST, DATA HANDLING, ALGEBRAIC EXPRESION, ALGEBRAIC IDENTITIES, FACTORISATION, LINEAR EQUATION, MENSURATION, POLYGON.