

CLASS: X

INTERNATIONAL INDIAN SCHOOL, RIYADH

SUBJECT: MATHEMATICS

TOPIC: REAL NUMBERS

1. If $7 \times 5 \times 3 \times 2 + 3$ is composite number? Justify your answer
2. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$ where q is a positive integer
3. Show that 8^n cannot end with the digit zero for any natural number n
4. Prove that $\frac{3\sqrt{2}}{5}$ is irrational
5. Prove that $5 - 2\sqrt{3}$ is an irrational number
6. Prove that $\sqrt{2}$ is irrational
7. Prove that $\sqrt{2} + \sqrt{3}$ is irrational
8. Prove that $n^2 - n$ is divisible by 2 for every positive integer n .
9. Prove that the sum of a rational and an irrational number is always irrational.
10. Use Euclid's Division Algorithms to find the H.C.F of 135 and 225
11. Using Euclid's division algorithm, check whether the pair of numbers 50 and 20 are co-prime or not. (45)
12. Find the HCF and LCM of 26 and 91 and verify that $\text{LCM} \times \text{HCF} = \text{Product of two numbers}$ (13,182)
13. Explain why $\frac{29}{2^3 \times 5^3}$ is a terminating decimal expansion
14. Find HCF of 96 and 404 by prime factorization method. Hence, find their LCM.
15. Using prime factorization method find the HCF and LCM of 72, 126 and 168 (4, 9696)
16. If $\text{HCF}(6, a) = 2$ and $\text{LCM}(6, a) = 60$ then find a (6, 504)
17. given that $\text{LCM}(77, 99) = 693$, find the HCF (77, 99) (20)
18. Find the greatest number which exactly divides 280 and 1245 leaving remainder 4 and 3 (11)
19. The LCM of two numbers is 64699, their HCF is 97 and one of the numbers is 2231. Find the other (138)
20. Two numbers are in the ratio 15 : 11. If their HCF is 13 and LCM is 2145 then find the numbers (2813)
21. Express 0.363636..... in the form a/b (195,143)
22. Write whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification give a rational or an irrational number (4/11)
23. State whether 10.064 is rational or not. If rational, express in p/q form
24. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$
25. The decimal expansion of the rational number $\frac{74}{2^3 \cdot 5^4}$ will terminate after Places
26. Is it possible for the HCF and LCM of two numbers to be 18 and 378 respectively? Justify your answer
27. Determine the values of p and q so that the prime factorization of 2520 is expressible as $2^3 \times 3^p \times q \times 7$ (2, 5)
28. Find the HCF of 65 and 117 by Euclid division algorithm and express it in the form $65m + 117n$ ($m = 2, n = -1$)
29. If the H.C.F of 210 and 55 is expressible in the form $210 \times 5 + 55y$, find y ($y = -19$)
30. Write the denominator of the rational number $\frac{173}{1250}$ in the form $2^m \times 5^n$, then find the value of m and n where m and n are non-negative integers. Hence write its decimal expansion without actual division (4, 1 and 0.1384)

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TOPIC: POLYNOMIALS

- Show that $x^2 - 3$ is a factor of $2x^4 + 3x^3 - 2x^2 - 9x - 12$
- Divide $(6 + 19x + x^2 - 6x^3)$ by $(2 + 5x - 3x^2)$ and verify the division algorithm
- Find other zeroes of the polynomial $p(x) = 2x^4 + 7x^3 - 19x^2 - 14x + 30$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$ (3/2, -5)
- Find all the zeroes of $2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ (1, -1/2)
- Find all the zeroes of polynomial $4x^4 - 20x^3 + 23x^2 + 5x - 6$ if two of its zeroes are 2 and 3 (1/2, -1/2)
- When a polynomial $f(x)$ is divided by $x^2 - 5$ the quotient is $x^2 - 2x - 3$ and remainder is zero. Find the polynomial and all its zeroes (3, -1, \sqrt{5}, -\sqrt{5})
- If the polynomial $f(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$, is divided by another polynomial $x^2 - 2x + k$ the remainder comes out to be $x + a$, Find k and a (k = 5, a = -5)
- On dividing $x^4 - 2x^3 - 5x - 8$ by a polynomial $g(x)$, the quotient and remainder were $x^2 + 5$ and $5x + 17$, respectively. Find $g(x)$ (x^2 - 2x - 5)
- If the polynomial $6x^4 + 8x^3 - 5x^2 + ax + b$ is exactly divisible by the polynomial $2x^2 - 5$, then find the values of a and b (-20, -25)
- If $x^4 - 2x^3 + 6x^2 - 6x + k$ is completely divisible by $x^2 - 2x + 3$, then find the value of k (k = 9)
- If the remainder on division of $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21, find the quotient and the value of k
- What must be subtracted from $2x^4 - 11x^3 + 29x^2 - 40x + 29$, so that the resulting polynomial is exactly divisible by $x^2 - 3x + 4$ (-2x + 5)
- Find the polynomial, whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ (x^2 - 4x + 4)
- Form a quadratic polynomial, one of whose zero is $2 + \sqrt{5}$ and the sum of zeroes is 4 (x^2 - 4x - 1)
- Find a quadratic polynomial whose sum and product of the zeroes are $21/8$ and $5/16$ (16x^2 - 42x + 5)
- Write a quadratic polynomial, the sum and product of whose zeroes are 3 and -2 (x^2 - 3x - 2)
- If α and β are the zeroes of the quadratic polynomial $x^2 - x - 2$, Find a polynomial whose zeroes $2\alpha + 1$ and $2\beta + 1$ (x^2 - 4x - 5)
- Find the zeroes of the polynomial and verify the relationship between the zeroes and the coefficient (k = 12)
 a) $4x^2 - 7$ b) $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ c) $2x^2 - 3\sqrt{2}x - 18$
- If zeroes α and β of a polynomial $x^2 - 7x + k$ are such that $\alpha - \beta = 1$, then find the value of k (k = 5)
- If one root of the polynomial $5x^2 + 13x + k$ is reciprocal of the other, then find the value of k (3)
- If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is reciprocal of the other. Find the value of a (5/6)
- If α and β are the zeroes of the polynomial $f(x) = 6x^2 + x - 2$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ (12)
- If α and β are the zeroes of the polynomial $f(x) = x^2 - 8x + k$ such that $\alpha^2 + \beta^2 = 40$, find k (-3/2)
- If α, β are the zeroes of a polynomial, such that $\alpha + \beta = 6$ and $\alpha\beta = 4$, then write the polynomial (-71/2)
- If the product of zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of a (-1)
- If α, β are the zeroes of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that $(\alpha + \beta)^2 - \alpha\beta = 24$ (7)
- If α and β are zeroes of $x^2 + 5x + 5$, find the value of $\alpha^{-1} + \beta^{-1}$ (133)
- α, β are the zeroes of the quadratic polynomial $x^2 - (k+6)x + 2(2k - 1)$. Find the value of k if $\alpha + \beta = \frac{1}{2}\alpha\beta$ (12)
- If α, β are the zeroes of the quadratic polynomial $x^2 - 7x + 10$, find the value of $\alpha^3 + \beta^3$ (5/2, -7, -4)
- If α and β are the zeroes of the quadratic polynomial $x^2 - 5x + 8$, find the value of $\alpha^4 + \beta^4$ (1)
- m, n are zeroes of $ax^2 - 12x + c$. Find the value of a and c if $m + n = m n = 3$
- Find the sum and the product of the zeroes of cubic polynomial $2x^3 - 5x^2 - 14x + 8$
- If 1 is a zero of polynomial $ax^2 - 3(a-1) - 1$, then find the value of a

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QUADRATIC EQUATIONS

- 1) Solve for x:
- $4x^2 - 4a^2x + (a^4 - b^4) = 0$
 - $9x^2 - 3(a+b)x + ab = 0$
 - $(a+b)x^2 + (a+2b+c)x + (b+c)$
 - $abx^2 = (a+b)^2(x-1)$
 - $x^2 - (2b-1)x + (b^2 - b - 20) = 0$
 - $\frac{a}{x-b} + \frac{b}{x-a} = 2$

$$(a^2 + b^2/2, a^2 - b^2/2)$$

$$(a/3, b/3)$$

$$-1, -(b+c)/a+b$$

$$(a+b/b, a+b/a)$$

$$(b+4, b-5)$$

$$(a+b, a+b/2)$$

2) find the value of k so that the quadratic equation has equal roots:

$$(k+3)x^2 + 2(k+3)x + 4 = 0$$

3) For what value of p the equation $(1+p)x^2 + 2(1+2p)x + (1+p) = 0$ has coincident roots

$$(1, -3)$$

4) Find the roots of the following quadratic equation by the method of completing the Square.

$$(0, -2/3)$$

i) $a^2x^2 - 3abx + 2b^2 = 0$

ii) $2x^2 = 6 - 5x$

$$(2b/a, b/a)$$

5) Solve the following quadratic equations by factorization method:

a) $3x^2 - 2\sqrt{6}x + 2 = 0$

b) $x^2 - 5\sqrt{5}x + 30 = 0$

c) $abx^2 + (b^2 - ac)x - bc = 0$

$$(\sqrt{2/3}, \sqrt{2/3})$$

$$(3\sqrt{5}, 2\sqrt{5})$$

$$(-b/a, c/b)$$

6) Solve for x: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$

7) Solve for x: $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$

$$(-a, -b)$$

8) Solve for x: $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$

$$(3/2, -5/2)$$

9) Solve for x: $\frac{1}{x} + \frac{2}{2x-3} = \frac{1}{x-2}$

$$(7, -9)$$

$$(3, 1)$$

10) If the roots of the quadratic equation $p(q-r)x^2 + q(r-p)x + r(p-q) = 0$ are equal, show that $1/p + 1/r = 2/q$

11) If the equation $(1+m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1+m^2)$

12) If the roots of the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal, prove that $a : b = c : d$

13) If the roots of the quadratic equation $(x-a)(x-b) + (x-b)(x-c) + (x-c)(x-a) = 0$ are equal, then show that $a = b = c$

14) If the roots of the equation $x^2 + 2px + mn = 0$ are real and equal, show that the roots of the quadratic equation $x^2 - 2(m+n)x + (m^2 + n^2 + 2p^2) = 0$ are also equal

15) Solve for x: $2 \left[\frac{2x-1}{x+3} \right] - 3 \left[\frac{x+3}{2x-1} \right] = 5$

$$(-10, -1/5)$$

16). If -4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, find the value of p and q

$$(3, 9/4)$$

- 17) The sum of the squares of two consecutive odd numbers is 394. Find the numbers. (13, 15)
- 18) The sum of the squares of two consecutive multiples of 7 is 637. Find the multiples (14, 21)
- 19) The product of 3 consecutive even numbers is equal to 20 times their sum. Find the numbers (6, 8, and 10)
- 20) The sum of the areas of two squares is 640 m^2 . If the difference in their perimeter is 64 m . Find the sides of the two squares (8 m, 24 m)
- 21) The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{21}$, find the numbers (3, 7)
- 22) The perimeter of a right angled triangle is 70 units and its hypotenuse is 29 units. Find the lengths of the other sides (20, 21)
- 23) The length of the sides forming a right angled Δ is $5x \text{ cm}$ and $(3x - 1) \text{ cm}$. Area of the triangle is 60 cm^2 . Find the hypotenuse (17 cm)
- 24) A natural number, when increased by 12, becomes equal to 160 times its reciprocal. Find the number (8)
- 25) A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together Can finish it in 4 days; find the time taken by B to finish the work (12 days)
- 26) A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number (92)
- 27) The speed of a boat in still water is 15 km/hr . It can go 30 km upstream and return downstream to the original point in 4hrs 30min. Find out the speed of the stream (5km/hr)
- 28) A train travels 180 km at a uniform speed. If the speed had been 9 km/hr more, it would have taken 1 hour less for the same Journey. Find the speed of the train. (36km/hr)
- 29) A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time it had to increase the speed by 250 km/h from the usual speed. Find its usual speed (750 km / hr)
- 30) The age of father is equal to the square of the age of his son. The sum of the age of father and five times the age of the son is 66 years. Find their ages (36y, 6y)
- 31) Two water taps together can fill a tank in 6 hrs. The tap of larger diameter takes 9 hrs less than the smaller one to fill the Tank separately. Find the time in which each tap can separately fill the tank (18hrs, 9 hrs)
- 32) Rs 1200 were distributed equally among certain number of students. Had there been 8 more students, each would have Received Rs 5 less. Find the number of students. (40)

ARITHMETIC PROGRESSIONS

- 1) For what value of p, are $2p - 1$, 7 and $3p$ three consecutive terms of an A.P? (1, -3)
- 2) If $\frac{1}{x+2}$, $\frac{1}{x+3}$ and $\frac{1}{x+5}$ are in A.P, find the value of x (173)
- 3) Find the 15th term from the end of the A.P: 3, 5, 7,....., 201 (-32)
- 4) Find the 11th term from the end of the A.P: 10, 7, 4,....., - 62 (253)
- 5) Find the middle term of A.P: 1, 8, 15,, 505 (24)
- 6) Which term of the sequence 114, 109, 104... is the first negative term? (32)
- 7) Which term of the sequence 121, 117, 113... is the first negative term? (3)
- 8) The 4th term of an A.P is equal to 3 times the first term and the 7th term exceeds twice the 3rd term by 1. Find the A.P (3, 5, 7, ...)
- 9) Determine the 2nd term and nth term of an A.P whose 6th term is 12 and 8th term is 22 (- 8, - 18 + 5n)
- 10) If 6 times the sixth term of an A.P is equal to 15 times the fifteenth term, find its 21st term (40°, 60°,
- 11) For A.P. a_1, a_2, a_3, \dots if $a_4/a_7 = 2/3$, find a_6/a_8 (7, 1, and -
- 12) The angles of a triangle are in A.P, the last being half the greatest. Find the angles. (- 50)
- 13) The sum of 3 numbers in A.P is 3 and their product is -35. Find the numbers (6n -
- 14) If the 4th term of an A.P is twice the 8th term, prove that the 10th term is twice the 11th term (8n - 2
- 15) Find $a_{30} - a_{20}$ for the A.P : -9, -14, -19, -24,
- 16) In an A.P., the first term is 25, nth term is -17 and sum to first n terms is 60. Find n and d the common difference. (6n + 2,
- 17) If S_n , the sum of first n terms of an A.P is given by $S_n = 3n^2 - 4n$, then find its nth term (2n -
- 18) The sum of the first n terms of an A.P is $4n^2 + 2n$. Find the nth term of this A.P.
- 19) The sum of n terms of an A.P. is $3n^2 + 5n$. Find the A.P. Hence, find its 16th term
- 20) Find the sum of n terms of an A.P whose nth term is given by $t_n = 5 - 6n$
- 1) Find the sum of 3 digit numbers which are not divisible by 7

- 22) Find the sum of all the natural numbers upto 100, which are not divisible by 5
- 23) Find the sum of all three digit numbers which leave the remainder 3 when divided by 5
- 24) If $2 + 5 + 8 + \dots + x = 155$, find x ($n = 10, x = a_{10} =$
- 25) Find the sum of the following A.P: $1 + 3 + 5 + \dots + 199$. (10000)
- 26) Find the common difference of an AP whose first term is 100 and sum of first six terms is 5 times the the sum of the next 6 terms
- 27) Find the number of terms of the A.P, 63, 60, 57, So that their sum is 693 ($n = 22,$
- 28) How many terms of the sequence 18, 16, 14,, should be taken so that their sum is 0 ($n =$
- 29) A sum of Rs 1400 is to be used to give 7 cash prizes to students of a school for their overall academic Performance. if each prize is Rs40 less than the preceding price, find the value of each of the prizes. (320, 280, 240, 200, 160, 120, 80)
- 30) Find the sum of first 22 terms of an A.P. in which $d = 7$ and 22nd term is 149
- 31) Find the sum of the following A.P: $3, 9/2, 6, 15/2, \dots$ To 25 terms
- 32) The ratio of the sum to p terms and q terms of an A.P. is $p^2 : q^2$. Prove that the common difference of the
Is twice the first term
- 33) an auditorium has 50 rows with 20 seats in the first row, 22 in the second, 24 in the third and so fourth. How many seats are in the auditorium ?
- 34) If the ratio of the sums of m and n terms of an A .P is $m^2 : n^2$, show that the ratio of its m^{th} and n^{th} terms is $(2m - 1) : (2n - 1)$
- 35) The p^{th} , q^{th} , r^{th} terms of an A.P are $a, b,$ and c respectively. Show that $a(q - r) + b(r - p) + c(p - q) = 0$
- 36) If the m^{th} term of an A.P is $1/n$ and the n^{th} term is $1/m$. S how that sum of mn terms is $\frac{1}{2} (mn + 1)$
- 37) The p^{th} term of an A.P is q and q^{th} term is p . Show that its r^{th} term is $p + q - r$
- 38) If m times the m^{th} term of an A.P is equal to n times its n^{th} term, find its $(m + n)^{\text{th}}$ term
- 39) The sum of the first five terms of an A.P is 25 and the sum of of its next five terms is -75 . Find the 10th term of the A.P (-23)
- 40) The sum of the first 7 terms of an A.P. is 63 and the sum of its next 7 terms is 161. Find the 28th term of this A.P (57)
- 41) If S_n denotes the sum of the first n terms of an A.P. Prove that $S_{30} = 3(S_{20} - S_{10})$.
- 42) In an A.P , if $S_5 + S_7 = 167$ and $S_{10} = 235$, find the first term ($a = 1$)

43) If s_1, s_2, s_3 are the sums of the terms of n three series in A.P, the first term of each being 1 and the respectively Common difference being 1, 2, 3, prove that $s_1 + s_3 = 2 s_2$

Mahabooob pasha

COORDINATE GEOMETRY

- 1) Δ Show that the points (a, a) , $(-a, -a)$ and $(-\sqrt{3}a, \sqrt{3}a)$ are the vertices of an equilateral
- 2) Show that four points $(0, -1)$, $(6, 7)$, $(-2, 3)$ and $(8, 3)$ are the vertices of a rectangle
- 3) Prove that the diagonals of a rectangle with vertices $(0, 0)$, $(a, 0)$, (a, b) and $(0, b)$ bisect each other and are equal.
- 4) Prove that $(4, -1)$, $(6, 0)$, $(7, 2)$ and $(5, 1)$ are the vertices of a rhombus. Is it a square?
- 5 Show that the points $A(3, 5)$, $B(6, 0)$, $C(1, -3)$ and $D(-2, 2)$ are the vertices of a square ABCD
- 6) Show that the following points are the vertices of a right angled isosceles triangle: $(1, 2)$, $(1, 5)$ and $(4, 2)$
- 7) Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$ $(x - y = 2)$
- 8) If the distance of $P(x, y)$ from the points $A(3, 6)$ and $B(-3, 4)$ are equal, prove that $3x + y = 5$
- 9) Find the values of x for which the distance between the points $P(2, -3)$ and $Q(x, 5)$ is 10 units $(8 \text{ or } -4)$
- 10) Given $A(-2, 3)$ and $AB = 10$ units. If ordinate of B is 9, find abscissa of B $(-10, 6)$
- 11) Find the coordinates of the point equidistant from three given points $A(5, 1)$, $B(-3, -7)$ and $C(7, -1)$
- 12) If the point $p(x, y)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$, prove that $bx = ay$
- 13) Find the point on y -axis which is equidistant from the point $(5, -2)$ and $(-3, 2)$ $(0, -2)$
- 14) Find the point on x -axis which is equidistant from the points $(2, -5)$ and $(-2, 9)$ $(-7, 0)$
- 15) If the points $A(4, 3)$, and $B(x, 5)$ are on the circle with the centre. $O(2, 3)$, find the value of x $(x = 2)$
- 16) The three consecutive vertices of a parallelogram are $(-2, 1)$, $(1, 0)$ and $(4, 3)$. Find the Coordinates of the fourth vertex $(1, 4)$
- 17) If $(-2, -1)$, $(a, 0)$, $(4, b)$ and $(1, 2)$ are the vertices of a parallelogram taken in order, find the value of a and b $(a = 1, b = 3)$
- 18) Find the value of m , for which the points with co-ordinates $(3, 5)$, $(m, 6)$ and $[1/2, 15/2]$ are collinear $(m = 2)$
- 19) Find the value of p for which the points $(p + 1, 2p - 2)$, $(p - 1, p)$ and $(p - 3, 2p - 6)$ are collinear. $(p = 4)$
- 20) Find a relation between x and y , if (x, y) , $(1, 3)$ and $(8, 0)$ are collinear $(3x + 7y = 24)$
- 21) If the points $(-2, 1)$, (a, b) and $(4, -1)$ are collinear and $a - b = 1$, then find the values of a and b $(a = 1, b = 0)$
- 22) Check whether the points $(-1, 1)$, $(5, 7)$ and $(8, 10)$ are collinear.
- 23) If the points (p, q) , (m, n) and $(p - m, q - n)$ are collinear, show that $pn = qm$
- 24) Show that the point $P(-4, 2)$ lies on the line segment joining the points $A(-4, 6)$ and $B(-4, -6)$
- 25) If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral ABCD. (72)
- 26) If the points $A(1, -2)$, $B(2, 3)$, $C(-3, 2)$ and $D(-4, -3)$ are the vertices of parallelogram ABCD, then taking AB as the base, find the height of the parallelogram ABCD
- 27) Using $A(4, -6)$, $B(3, -2)$ and $C(5, 2)$, verify that a median of the ΔABC divides it into two triangles of equal areas
- 28) The coordinates of A, B, C are $(3, 4)$, $(5, 2)$, (x, y) respectively. If area of $\Delta ABC = 3$, show that $x + y = 10$
- 29) The coordinates of the vertices of ΔABC are $A(4, 1)$, $B(-3, 2)$ and $C(0, k)$. Given that the area of ΔABC is 12 unit^2 , Find k $(k = -13/7)$
- 30) The points $A(2, 9)$, $B(a, 5)$, $C(5, 5)$ are the vertices of a triangle ABC right angled at B . Find the value of a and hence find the area of ΔABC $(a = 2, \text{ area} = 6\text{sq units})$

- 31) If point $P(1/2, y)$ lies on the line segment joining two points $A(3, -2)$ and $B(-7, 9)$, then find the ratio in which P divides AB ? Also find the value of y
- 32) Find the ratio in which the point $(2, y)$ divides the line segment joining the points $A(-2, 2)$ and $B(3, 7)$ (4:1)
- 33) Find the ratio in which the line $2x + y - 5 = 0$ divides the line segment joining $A(2, -3)$ and $B(3, 9)$ (2:5)
- 34) Find the ratio in which the line segment joining the points $(1, -3)$ and $(4, 5)$ is divided by x -axis
- 35) The line segment AB , joining the points $A(3, -4)$ and $B(1, 2)$ is trisected at the points $P(p, -2)$ and $Q(5/3, q)$. Find the value of P and Q (7/3, 0)
- 36) Find the coordinates of the points which divide the line segment joining $A(2, -3)$ and $B(-4, -6)$ into three equal parts
- 37) Find the length of medians of triangle whose vertices are $A(-1, 3)$, $B(1, -1)$, and $C(5, 1)$
- 38) The coordinates of one end point of a diameter of a circle are $(4, -1)$ and the coordinates of the centre of the circle are $(1, -3)$ Find the coordinates of the other end of the diameter (-2, -5)
- 39) The centre of a circle is $(2a - 1, 7)$ and it passes through the point $(-3, -1)$. If the diameter of the circle is 20 units then find the value of a
- 40) Find the centroid of the ΔABC whose vertices are $A(-3, 0)$, $B(5, -2)$ and $C(-8, 5)$ (-2, 1)
- 41) If the point $(k, 3)$ is the centroid of the triangle whose vertices are $(2, 4)$, $(3, k)$ and $(4, 2)$. Find the value of k ($k = 3$)
- 42) If (x, y) is a point on the line joining $(a, 0)$ and $(0, b)$, show that $x/a + y/b = 1$
- 43) The vertices of a ΔABC are $A(3, 0)$, $B(0, 6)$, $C(6, 9)$ and DE divides AB and AC in the ratio $1 : 2$. Prove that $\text{ar } \Delta ABC = 9 \times \text{ar } \Delta ADE$ remaining
- 44) The opposite angular points of a square are $(5, 4)$ and $(-1, 6)$. Find the co ordinates of the remaining two vertices (1, 3)
- 45) Show that ΔABC with vertices $A(-2, 0)$, $B(0, 2)$ and $C(2, 0)$ is similar to ΔDEF with vertices $D(-4, 0)$, $F(4, 0)$ and $E(0, 4)$
- 46) If two adjacent vertices of a parallelogram are $(3, 2)$ and $(-1, 0)$ and the diagonals intersect at $(2, -5)$, then find the coordinates of the other two vertices

INTERNATIONAL INDIAN SCHOOL, RIYADH

Class: x

SUBJECT: MATHEMATICS

PT - I

1. Use Euclid division algorithm to find the H.C.F of 420 and 130
2. Prove that $\sqrt{3}$ is irrational number
3. Prove that $5 - \sqrt{3}$ is irrational
4. If d is the H.C.F of 45 and 27 , find x , y satisfying $d = 27x + 45 y$
5. Given that H.C.F (306, 657) = 9, find L.C.M (306, 657)
6. In a morning walk , three persons step of together . Their step measures 80 cm, 85cm and 90 cm . What is the minimum distance each should walk so that they cover the distance in complete steps
7. Write the denominator of $\frac{91}{1250}$ in the form $2^n 5^m$, where n and m are non-negative

Integers. Also write its decimal expansion without actual division

8. Find the zeroes of the polynomial $2x^2 + 2x - 12$ and verify the relationship between the zeroes and the coefficient
9. If α and β are the zeroes of the polynomial $x^2 - 7x + 10$, find the value of $\alpha^3 + \beta^3$
10. Find all the zeroes of the polynomial $x^4 - 7x^2 + 12$, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$
11. What is the values of p and q if the polynomial $x^4 + x^3 + 8x^2 + px + q$ is exactly divisible by $x^2 + 1$
12. Divide $(6 + 23x + 25x^2 + 6x^3)$ by $(3 + 7x + 2x^2)$ and verify division algorithm
13. On dividing the polynomial $4x^4 - 5x^3 - 39x^2 - 46x - 2$ by the polynomial $g(x)$, the quotient and remainder were $x^2 - 3x - 5$ and $-5x + 8$ respectively . Find $g(x)$
14. Quadratic polynomial $2x^2 - 3x + 1$ has a zeroes as α and β . Now form a quadratic polynomial whose zeroes are 3α and 3β
15. Draw the graphs of the equation $x - y = -1$ and $3x + 2y = 12$. Determine the coordinates of the vertices of the triangle formed by these lines and the x - axis and shade the triangular region.
16. The area of a rectangle get reduced by 9sq units , if its length is reduced by 5 units and breadth is increased by 3 units. If we increased the length by 3 units and breadth by 2 units , the area increases by 67 sq units. Find the dimensions of the rectangle
17. The sum of a two digit number and the number formed by interchanging its digits is 110. If 10 is subtracted from the first number, the new number is 4 more than 5 times the sum of the digits, find the number

18. Solve for x and y : $ax - by = a^2 - b^2$, $x + y = a + b$

19. Solve for x and y : $\frac{x}{10} + \frac{y}{5} = 14$, $\frac{x}{8} + \frac{y}{6} = 15$

20. Solve for x and y : $\frac{30}{x-y} + \frac{44}{x+y} = 10$

$$\frac{40}{x-y} + \frac{55}{x+y} = 13$$

21. Find the values of a and b for which the following system of linear equations has infinitely many solutions. $3x - (a + 1)y = 2b - 1$, $5x + (1 - 2a)y = 3b$
22. Find the value of k will the following system of linear equations have no solutions.
 $3x + y = 1$, $(2k - 1)x + (k - 1)y = 2k + 1$
23. Write whether the following pair of linear equations is consistent or not :
 $x + y = 14$, $x - y = 4$
24. Find two consecutive odd positive integers, sum of whose squares is 290
25. Solve for x : $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$
26. Find the value of p for which the quadratic equation $(p + 1)x^2 - 6(p + 1)x + 3(p + 9) = 0$ has equal roots. Hence, find the roots of the equation.
27. Find the values of k for which the quadratic equation $9x^2 - 3kx + k = 0$ has equal roots.
28. Solve for x : $\sqrt{3x^2} - 2\sqrt{2x} - 2\sqrt{3} = 0$
29. Solve for x : $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$
30. Solve by the method of completing the square : $6x^2 - 2 - x = 0$
31. Solve for x : $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0$
32. Solve for x : $\sqrt{2x+9} + x = 13$
33. Solve for x : $99x + 101y = 499$, $101x + 99y = 501$
34. Two water taps together can fill a tank in 9 hrs. 36 minutes. The tap of larger diameter takes 8 hrs less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank
35. A passenger, while boarding the plane, slipped from the stairs and got hurt. The pilot took the passenger in the emergency clinic at the airport for treatment. Due to this, the plane got delayed half an hour. To reach the destination 1500km away in time, so that the passengers could catch the connecting flight, the speed of the plane was increased by 250 km/hr than the usual speed. Find the usual speed of the plane
36. A motor boat whose speed in still water is 18km/hr, takes 1 hr more to go 24km upstream than to return downstream to the same spot. Find the speed of the stream
37. Find the 31st term of an A.P whose 11th term is 38 and 16th term is 73
38. Find the sum of first 22 terms of an A.P in which d = 7 and 22nd term is 149
39. Find the 9th term from the end of the A.P : 5, 9, 13,, 185
40. For what value of k will k + 9, 2k - 1 and 2k + 7 are the consecutive terms of an A.P
41. The 4th term of an A.P is 0, prove that 25th term of the A.P is three times its 11th term
42. Find the middle term of the A.P : 6, 13, 20,, 216
43. The 9th term of an A.P is - 32, and the sum of its 11th and 13th terms is - 94. Find the common difference of the A.P
44. Find the number of all three digit natural numbers which are divisible by 9
45. The sum of first n terms of an A.P is $3n^2 + 4n$. Find the 25th term of this A.P
46. The 5th term of an A.P exceeds its 12th term by 14. If its 7th term is 4., find the A.P
47. The sum of the first 16th terms of an A.P is 112 and the sum of its next 14th terms is 518. Find the A.P
48. How many terms of the A.P: 65, 60, 55, be taken so that their sum is zero

TRIGONOMETRY

(WORKSHEET)

- 1) Prove that: $\frac{\sin\theta}{1-\cos\theta} = \operatorname{cosec}\theta + \cot\theta$.
- 2) Prove that: $(1 + \cot\theta - \operatorname{cosec}\theta)(1 + \tan\theta + \sec\theta) = 2$.
- 3) Show that: $(1 + \frac{1}{\tan^2\theta})(1 + \frac{1}{\cot^2\theta}) = \frac{1}{\sin^2\theta - \sin^4\theta}$.
- 4) Prove that: $\cot\theta - \tan\theta = \frac{2\cos^2\theta - 1}{\sin\theta \cos\theta}$.
- 5) Show that: $\frac{\operatorname{cosec}\theta + \cot\theta}{\operatorname{cosec}\theta - \cot\theta} = 1 + 2\cot^2\theta + 2\operatorname{cosec}\theta \cot\theta$.
- 6) Prove that: $\frac{\operatorname{cosec}A}{\operatorname{cosec}A - 1} + \frac{\operatorname{cosec}A}{\operatorname{cosec}A + 1} = 2 + 2\tan^2A$.
- 7) Show that: $\frac{1}{\sec X - \tan X} - \frac{1}{\cos X} = \frac{1}{\sec X + \tan X} - \frac{1}{\cos X}$.
- 8) Prove that: $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1 + \sin\theta}{\cos\theta}$.
- 9) Prove that: $\frac{\cos A}{1 - \tan A} - \frac{\sin^2 A}{\cos A - \sin A} = \sin A + \cos A$.
- 10) Prove that: $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{2\sec^2\theta}{\tan^2\theta - 1}$.
- 11) Prove that: $\frac{\tan\theta}{1 - \cot\theta} + \frac{\cot\theta}{1 - \tan\theta} = 1 + \tan\theta + \cot\theta$.
- 12) Prove that: $\frac{1}{\operatorname{cosec}\theta - \cot\theta} - \frac{1}{\sin\theta} = \frac{1}{\sin\theta} - \frac{1}{\operatorname{cosec}\theta + \cot\theta}$.
- 13) Prove that: $\sqrt{\frac{\sec\theta - 1}{\sec\theta + 1}} + \sqrt{\frac{\sec\theta + 1}{\sec\theta - 1}} = 2\operatorname{cosec}\theta$.
- 14) Simplify: $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$.
- 15) If $x = y\cos\alpha\sin\beta$; $y = y\cos\alpha\cos\beta$ and $z = y\sin\alpha$, show that $x^2 + y^2 + z^2 = y^2$.
- 16) If $\sin\theta = \frac{3}{5}$, find the value of $(\tan\theta + \sec\theta)^2$.
- 17) If $3\cot\theta = 4$, find the value of $\frac{5\cos\theta - 2\sin\theta}{5\cos\theta + 3\sin\theta}$.
- 18) If $\sqrt{3}\tan\theta = 3\sin\theta$, find the value of $\sin^2\theta - \cos^2\theta$.
- 19) Find the value of: $\sin^2 20^\circ + \sin^2 70^\circ - \tan^2 45^\circ$.
- 20) Find the value of: $\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 31^\circ + \sin^2 59^\circ} + \sin^2 64^\circ + \cos 64^\circ \sin 26^\circ$.
- 21) Evaluate: $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\operatorname{cosec} 40^\circ}{\sec 50^\circ} - 4\cos 50^\circ \operatorname{cosec} 40^\circ$.
- 22) Evaluate: $\frac{\tan 35^\circ}{\cot 55^\circ} + \frac{\cot 78^\circ}{\tan 12^\circ} - 1$.
- 23) Evaluate: $\frac{\sec\theta \operatorname{cosec}(90^\circ - \theta) - \tan\theta \cot(90^\circ - \theta) + \sin^2 55^\circ + \sin^2 35^\circ}{\tan 10^\circ \tan 20^\circ \tan 60^\circ \tan 70^\circ \tan 80^\circ}$.
- 24) Evaluate: $\sec^2 10^\circ - \cot^2 80^\circ + \frac{\sin 15^\circ \cos 75^\circ + \cos 15^\circ \sin 75^\circ}{\cos\theta \sin(90^\circ - \theta) + \sin\theta \cos(90^\circ - \theta)}$.
- 25) Evaluate: $\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 54^\circ}{\cos 38^\circ \operatorname{cosec} 52^\circ}$.
- 26) Evaluate: $\frac{3\cos 55^\circ}{7\sin 35^\circ} - \frac{\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 54^\circ}{7\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$.
- 27) If $\sec\theta = x + \frac{1}{4x}$ prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$.
- 28) If $\sec\theta + \tan\theta = p$, prove that $\sin\theta = \frac{p^2 - 1}{p^2 + 1}$.

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES.

(WORK SHEET)

1. The taxi charges in a city comprise of a fixed charge together with the charge of the distance covered. For a journey of 10km, the charge paid is Rs.75 and for a journey of 15km, the charge paid is Rs.110. What will a person have to pay for travelling a distance of 25km.
2. A number consists of 2 digits. Where the number is divided by the sum of its digits, the quotient is 7. If 27 is subtracted from the number, the digits interchange their places, find the number.
3. The sum of the digits of a 2 digit number is 15. The number is decreased by 27, if the digits are reversed. Find the number.
4. The result of dividing a number of 2 digits by the number with the digits reversed is $\frac{7}{4}$. If the sum of the digits is 12, find the number.
5. Father's age is 3 times the sum of the ages of his two children. After 5 yrs his age will be twice the sum of age of 2 children. Find the age of father.
6. Five yrs hence the age of a father shall be 3 times the age of his son while 5 yrs earlier the age of the father was 7 times the age of his son. Find their present ages.
7. I am 3 times as old as my son. 5 yrs later, I shall be two and a half times as old as my son. How old am I and how old is my son?
8. A man sold a table and a chair together for Rs.850 at a loss of 10% on the table and a gain of 10% on the chair. By selling them together for Rs.950, he would have made a gain of 10% on the table and a loss of 10% on the chair. Find the C.P. of each.
9. The sum of numerator and denominator of a fraction is 8. If 3 is added to both the numerator and denominator the fraction becomes $\frac{3}{4}$. Find the fraction.
10. The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If 3 is added each the numerator and denominator, their ratio becomes 2:3. Find the fraction.
11. 8 men & 12 boys can finish a piece of work in 10 days. While 6 men & 8 boys can finish it in 14 days. Find the time taken by one man alone and that by one boy alone to finish the work.
12. On selling a tea set at 5% loss and a lemon set at 15% gain, a crockery gains Rs.7. If he sells the tea set at 5% gain and lemon set at 10% gain, he gains Rs.13. Find the actual price of the tea set.
13. In a den (a small enclosure) there are rabbits and pheasants. They have between them 35 heads and 98 feet. How many rabbits are there?
14. A man when asked how many hens and buffaloes he has, told that his animals have 120 eyes and 180 legs. How many hens and buffaloes has he?

23. If the sum of the first q terms of an AP is $2q+3q^2$. What is its common difference?
24. If the sum of the first m terms of an AP is $2m^2 + 3m$, then what is its second term?
25. Find the sum of the first 25 terms of an AP whose n th term is given by $t_n = 2-3n$.
26. If the sum of first n terms of an AP is given by $s_n = 3n^2 + 2n$, find the n th term of the AP.
27. The sum of 3 numbers in an AP is 27 and their product is 405. Find the numbers.
28. In an AP, the first term is 2, the last term is 29 and sum of the terms is 155. Find the common difference of the AP.
29. The sum of first 16 terms of an AP is 42. The ratio of its 10th term to its 30th term is
- 1:3. Calculate the first and 13th term of the AP.
30. If the 8th term of an AP is 37 and the 15th term is 15 more than the 12th term. Find the AP. Hence find the sum of the first 15 terms of the AP.
31. The sum of first 16 terms of an AP is 112 and the sum of its next 14 terms is 518. Find the AP.
32. The sum of first 10 terms of an AP is -80 and the sum of its next 10 terms is -280. Find the AP.
33. Find the sum of all 3 digit numbers which leaves the remainder 2, when divided by 3.
34. If the sum of first m terms of an AP is n and the sum of first n terms is m , show that the sum of first $(m+n)$ terms is $-(m+n)$.
35. If the p th term of an AP is $\frac{1}{q}$ and the q th term is $\frac{1}{p}$, show that the sum of pq terms is $\frac{1}{2}(pq+1)$.
36. Find the sum of 2n terms of the series : $1^2 - 2^2 + 3^2 - 4^2 + 5^2 - 6^2 + \dots$
37. How many terms of the AP : $20, 19\frac{1}{2}, 18\frac{1}{2}, \dots$ should be taken so that their sum is 300. Explain the double answer.
38. If $\frac{1}{x+2}, \frac{1}{x+3}$ and $\frac{1}{x+5}$ are in AP, find the value of x .
39. Find the sum of first 40 +ive integers divisible by 6.

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M.Sc, B Ed

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MATHEMATICS (CLASS - X)

ARITHMETIC PROGRESSION

- The n th term of an AP is $7-4n$. Find its common difference.
- Write the next term of the AP $\sqrt{8}, \sqrt{18}, \sqrt{32}$
- The first term of an AP is p and its common difference is q . Find its 10th term.
- Which term of the AP 21, 18, 15, is zero ?
- Which term of the AP 14, 11, 8, is -1?
- For what value of p , are $2p-1, 7$ and $3p$ three consecutive terms of an AP ?
- For what value of k , are the numbers $x, 2x+k$ and $3x+6$ three consecutive terms of an AP ?
- The 7th term of an AP is 32 and its 13th term is 62. Find the AP.
- Which term of the AP 3, 10, 17, will be 84 more than its 13th term ?
- The 8th term of an AP is -23 and its 12th term is -39. Find the AP.
- If m times the m th term of an AP is equal to n times its n th term, find its $(m+n)$ th term.
- The 9th term of an AP is zero. Prove that its 38th term is triple of its 18th term.
- Find 10th term from end of the AP 4, 9, 14, 254.
- If fifth term of an AP is zero, show that its 33rd term is 4 times its 12th term.
- Which term of AP 4, 12, 20, 28, will be 120 more than its 21st term.
- The 17th term of an AP exceeds its 10th term by 7. Find the common difference.
- If the 5th term of an AP is zero, prove that its 23rd term is 3 times its 14th term.
- If 9th term of an AP is zero prove that its 29th term is double of its 19th term.
- If 4 times the 4th term of an AP is equal to 18 times its 18th term, then find its 22nd term.
- Which term of the AP 120, 116, 112, is its first negative term.
- Calculate how many multiples of 8 are there between 100 and 500.
- In an AP the first term is 5 and the common difference is 2. If the last term of the AP is 53, find the middle term.

STATISTICS

(WORKSHEET)

1. In a school 85 boys and 35 girls appeared in a public examination. The mean marks of boys was found to be 40%, whereas the mean marks of girls was 60%. Determine the average marks percentage of the school.
2. The mean score of 25 observations is 80 and the mean score of another 55 observations is 65. Determine the mean score of the whole set of observations.

3. A cricketer has a mean score of 58 runs in nine innings. Find out how many runs are to be scored in the 10th innings to raise the mean score to 61.

4. If the mean of the following distribution is 6, find the value of p:

x	2	4	6	10	P+5
y	3	2	3	1	2

5. Find the mean of the following data:

Class interval	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30
Frequency	6	8	10	9	7

6. Find the value of p, if the mean of the following distribution is 18:

x	13	15	17	19	20+p	23
f	8	2	3	4	5p	6

7. The mean of the following frequency distribution is 62.8 and the sum of all frequencies is 50. Compute the missing frequencies x and y:

Class	0-20	20-40	40-60	60-80	80-100	100-120	Total
Frequency	5	x	10	y	7	8	50

8. The mean of the following frequency distribution is 62.8. Find the missing frequency x.

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	8	x	12	7	8

9. Compare the modal ages of two groups of students A and B appearing for an entrance test:

Age (in years)	Number of students of	
	Group A	Group B
16-18	50	54
18-20	78	89
20-22	46	40
22-24	28	25
24-26	23	17

10. The median of the following data is 32.5.

C.I.	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
f	x	5	9	12	y	3	2	40

Find the values of x and y.