ಕರ್ನಾಟಕ   ಸರ್ಕಾರ

ಎಸ್‌ಎಸ್‌ಎಲ್‌ಸಿ ಫಲಿತಾಂಶ ಸುಧಾರಣಾ ಸಮಿತಿ–2019

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲಾ ಪಂಚಾಯತ್

ಹಾಗೂ ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ,

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲೆ.

ಅಭ್ಯಾಸ ಪುಸ್ತಕ

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ)

ವಿಷಯ: ಗಣಿತ

ತರಗತಿ: 10

Some important formulae

1. The nth term of AP with first term 'a' and common difference 'd' is

$$a_n = a + (n - 1)d.$$

2. The sum of first n terms of AP with first term 'a' and common difference 'd' is

$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

3. Formula to find zeroes of a quadratic equation is.

$$X = \frac{-b \pm \sqrt{b^2 - 4\,a\,c}}{2\,a}$$

4. To form a quadratic polynomial using sum and product of zeroes is

$$p(x) = x^2 - (\alpha + \beta)\,x + \alpha\beta$$

5. Distance formula, 	1) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ 	2) $d = \sqrt{x^2 + y^2}$

6. Section formula 	$(x, y) = \left(\dfrac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \dfrac{m_1 y_2 + m_2 y_1}{m_1 + m_2}\right)$

7. Formula to find coordinates of midpoint is 	$(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

8. Formula to find area of a triangle using vertices

$$\Delta = \frac{1}{2}\,[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

9. Formula to find mean for the data

$$\overline{X} = \frac{\sum f_i\,x_i}{\sum f_i}$$

10. Formula to find median for the data

$$\overline{X} = l + \left[\frac{\frac{n}{2} - cf}{f_i}\right] X\,h$$

11. Formula to find mode for the data

$$\overline{X} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] Xh$$

12. Area of a sector $= \dfrac{\theta}{360°} \times \pi r^2$

13. Length of an arc of a sector $= \dfrac{\theta}{360°} \times 2\pi r$

ಮುನ್ನುಡಿ

ವಿದ್ಯಾರ್ಥಿಗಳ ಜೀವನದಲ್ಲಿ 10ನೇ ತರಗತಿಯು ಒಂದು ಮಹತ್ತರ ಘಟ್ಟ . ಈ ತರಗತಿಯಲ್ಲಿ ಪಡೆಯುವ ಫಲಿತಾಂಶವು ಅವರ ಭವಿಷ್ಯದ ಬದುಕಿಗೆ ಹೊಸ ತಿರುವನ್ನು ನೀಡಬಲ್ಲದು. ಪ್ರಸಕ್ತ ಸಾಲಿನಲ್ಲಿ ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲೆಯಲ್ಲಿ ಗುಣಮಟ್ಟದ ಮತ್ತು ದಾಖಿಲೆಯ ಪ್ರಮಾಣದ ಫಲಿತಾಂಶಕ್ಕಾಗಿ 'ಎಸ್‌ಎಸ್‌ಎಲ್‌ಸಿ ಫಲಿತಾಂಶ ಸುಧಾರಣಾ ಸಮಿತಿ–2019' ನ್ನು ರಚಿಸಲಾಗಿದೆ. ಸಮಿತಿಯ ಸರ್ಕಾರಿ ಮತ್ತು ಅನುದಾನಿತ ಪ್ರೌಢಶಾಲೆಗಳಲ್ಲಿನ ಅರ್ಧವಾರ್ಷಿಕ ಪರೀಕ್ಷಾ ಫಲಿತಾಂಶದ ಮಾನದಂಡವನ್ನು ಆಧರಿಸಿ ಗಣಿತ, ವಿಜ್ಞಾನ ಮತ್ತು ಇಂಗ್ಲೀಷ್ ವಿಷಯಗಳಲ್ಲಿ ಕಡಿಮೆ ಸಾಧನೆ ಮಾಡಿರುವ 2000 ಮಕ್ಕಳನ್ನು ಗುರುತಿಸಿ 'ವಿಶೇಷ ಪರಿಗಣಿತ ಗುಂಪು' (ವಿಪಿಜಿ) ನ್ನು ರಚಿಸಲಾಗಿದೆ. ಈ ವಿಪಿಜಿ ಗುಂಪಿನ ಮಕ್ಕಳ ಕಲಿಕಾ ಸುಧಾರಣೆಗಾಗಿ ಜಿಲ್ಲೆಯಾದ್ಯಂತ 33 ವಿಪಿಜಿ ಕೇಂದಗಳನ್ನು ಸ್ಥಾಪಿಸಿ ಅದಕ್ಕೆ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರನ್ನು ನಿಯೋಜಿಸಲಾಗಿದೆ. 'ಪರೀಕ್ಷಾ ಸಂಭ್ರಮಕ್ಕೆ ಸಿದ್ಧರಾಗಿ' ಕಾರ್ಯಕ್ರಮವನ್ನು ನಡೆಸಲಾಗಿದೆ. ಅಲ್ಲದೇ ಪ್ರತ್ಯೇಕ ವಿಪಿಜಿ ಸಿಲಬಸ್ ರಚನೆ, ವಾಹನ ಸೌಲಭ್ಯ , ರುಚಿಯೂಟ, ಕಲಿಕಾ ಸಾಮಗ್ರಿಗಳ ಪೂರೈಕೆ, ಕಲಿಕಾ–ಫಲ ತಿಳಿಯಲು 'ವಾರಕ್ಕೊಂದು ಪರೀಕ್ಷೆ', ಮಾರ್ಗದರ್ಶನ ನೀಡಲು ತಾಲ್ಲೂಕು ಮತ್ತು ಜಿಲ್ಲಾ ಹಂತದ ಅಧಿಕಾರಿಗಳ ನೇಮಕ, ಪೋಷಕರ ಸಭೆ , ಬೋಧನೆ– ಕಲಿಕಾ ಪ್ರಕ್ರಿಯೆಗಳ ಅನುಪಾಲನೆಗಾಗಿ ಶಾಲಾ ಭೇಟಿ, ಶಿಕ್ಷಕರಿಗಾಗಿ ಪುನಃಶ್ಚೇತನಾ ಕಾರ್ಯಕ್ರಮ , ಅಧಿಕಾರಿಗಳ ಪ್ರಗತಿ ಪರಿಶೀಲನಾ ಸಭೆ ಮುಂತಾದ ಅನೇಕ ಫಲಿತಾಂಶ ಸುಧಾರಣಾ ಕ್ರಮಗಳನ್ನು ಕೈಗೊಳ್ಳಲಾಗಿದೆ.

ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ 'ಗಣಿತ' ಒಂದು ಕ್ಲಿಷ್ಟಕರ ವಿಷಯ ಎಂಬುದು ಸಾಮಾನ್ಯ ಸಂಗತಿಯಾಗಿದೆ. ಈ ವಿಷಯಕ್ಕೆ ನಿರಂತರ ಅಭ್ಯಾಸದ ಅಗತ್ಯವಿದೆ. ಆದ್ದರಿಂದ ಈ ವಿಷಯದಲ್ಲಿಯೂ ಮಕ್ಕಳಿಗೆ ಆಸಕ್ತಿಯನ್ನು ತುಂಬಿ ಉತ್ಸಾಹ ಮೂಡಿಸಲು ಈ ' ಗಣಿತ ಅಭ್ಯಾಸ ಪುಸ್ತಕ ' ವನ್ನು ಹೊರತರಲಾಗಿದೆ. ವಿಪಿಜಿ ಮಕ್ಕಳು ಈ ಪುಸ್ತಕದ ಉಪಯೋಗವನ್ನು ಪೂರ್ಣ ಪ್ರಮಾಣದಲ್ಲಿ ಪಡೆದುಕೊಂಡು ಉತ್ತಮ ಫಲಿತಾಂಶ ತಂದುಕೊಡಲೆಂದು ತುಂಬು ಹೃದಯದಿಂದ ಹಾರೈಸುತ್ತೇನೆ.

ಈ ಅಭ್ಯಾಸ ಪುಸ್ತಕವು ಇಷ್ಟೊಂದು ಉಪಯುಕ್ತ ಕೈಪಿಡಿಯಾಗಿ ಮೂಡಿಬರಲು ಸಹಕರಿಸಿದ ಗಣಿತ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ತಂಡಕ್ಕೂ , ಇದರ ಮುದ್ರಣಕ್ಕೆ ನೆರವಾದ ಬೆಂ.ಅಂ.ವಿಮಾನ ನಿಲ್ದಾಣ ಸಂಸ್ಥೆಯ ಆಡಳಿತ ಮಂಡಳಿಗೂ , ಶೈಕ್ಷಣಿಕ ಮಾರ್ಗದರ್ಶಕರಾದ ಡಾ॥ ಆರ್. ನಾಗರಾಜಯ್ಯರವರಿಗೂ , ಸಹಕರಿಸುತ್ತಿರುವ ಸಹೋದ್ಯೋಗಿ ಮಿತ್ರರಿಗೂ , ಶಿಕ್ಷಣ ಇಲಾಖೆಯ ಎಲ್ಲಾ ಅಧಿಕಾರಿಗಳು , ಮುಖ್ಯ ಶಿಕ್ಷಕರು ಮತ್ತು ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರಿಗೂ ಅಭಿನಂದಿಸುತ್ತೇನೆ.

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ಆರ್. ಲತಾ ಭಾ.ಆ.ಸೇ.

ಮುಖ್ಯ ಕಾರ್ಯನಿರ್ವಹಣಾಧಿಕಾರಿಗಳು

ಜಿಲ್ಲಾ ಪಂಚಾಯತ್ ಬೆಂಗಳೂರು ಗ್ರಾ.ಜಿಲ್ಲೆ

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ದಿನಾಂಕ: 14–02–2019

Zilla panchayath and Department of public instruction ,
Bangalore Rural dt.
Minimum learning points

Subject: Mathematics   Standard: 10

Sl. No.	Topics	Marks
1	Solving pair of linear equations by graphical method	4
2	Theorem on Triangles	4
3	Ogive graph	3
4	Construction of similar triangle	3
5	Theorem on Circles	3
6	Mean / median / mode	3
7	Construction of tangent	2
8	Solving quadratic equations (Formula method / completing square method)	2
9	Examples on Probability	3
10	Polynomials (Exercise 9.2)	2
11	Polynomials (Exercise 9.3)	3
12	Examples on Real numbers	2
13	Solving pair of linear equations	2
14	Nature of roots	2
15	Coordinate geometry	4
	Total	40+

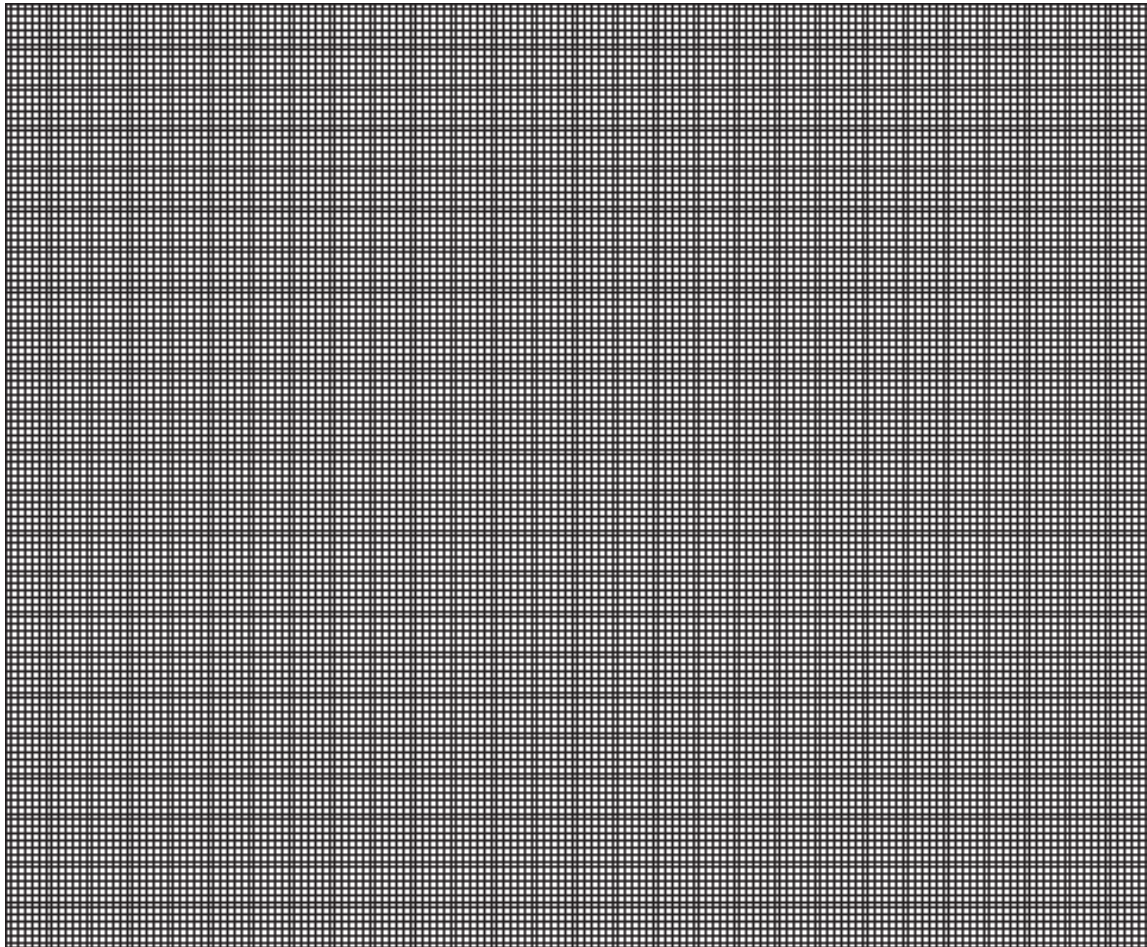# Solving pair of linear equations in two variables (graph)
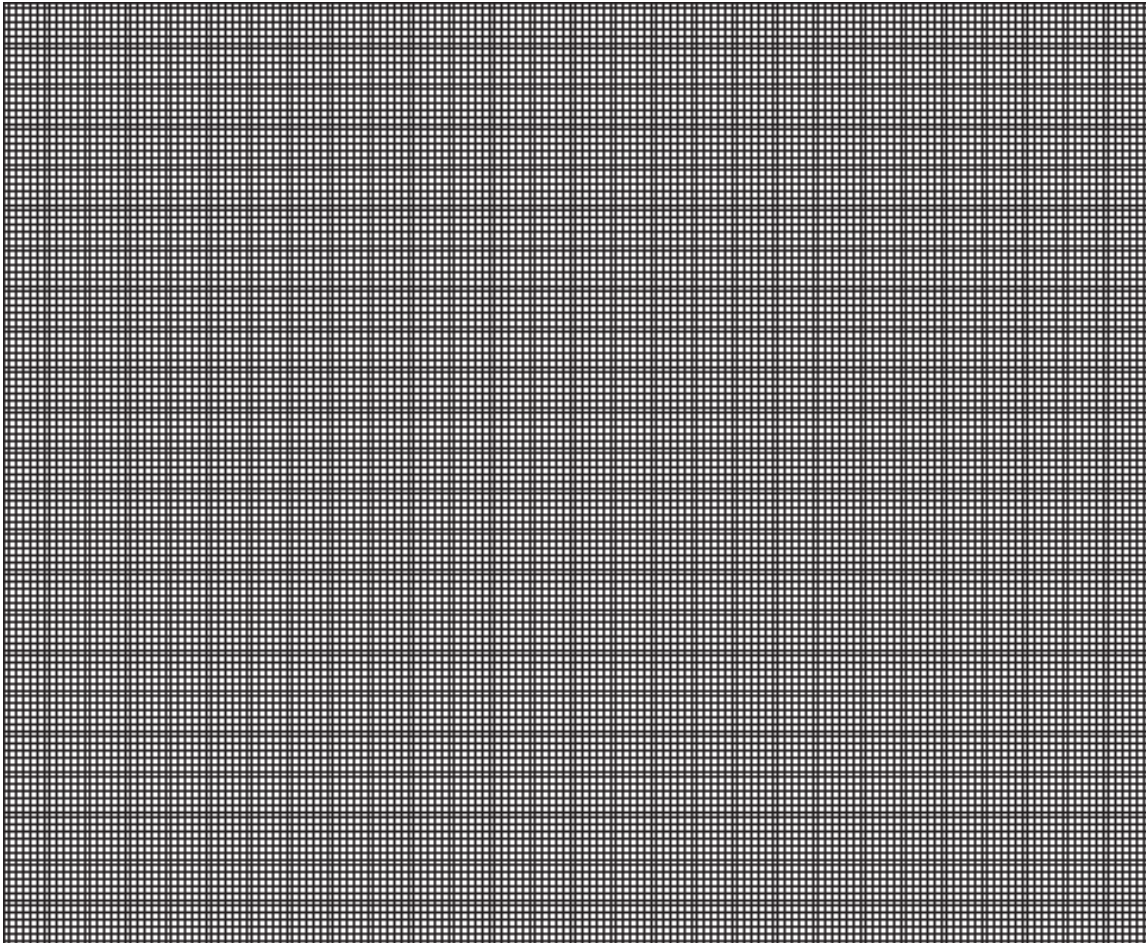
1. Solve graphically: X+Y=4 & X - Y =2
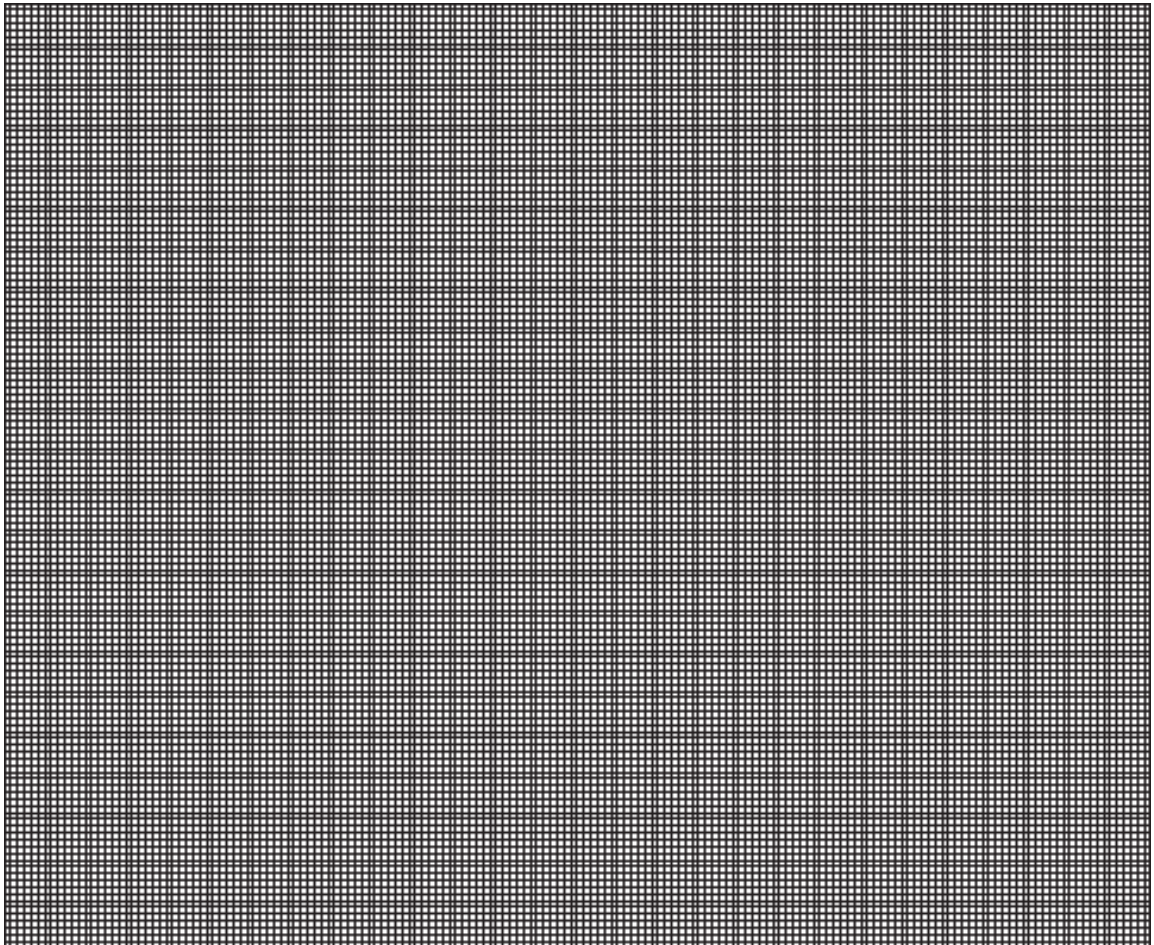
2. Solve graphically: $X+Y=3$ & $2X+Y=5$
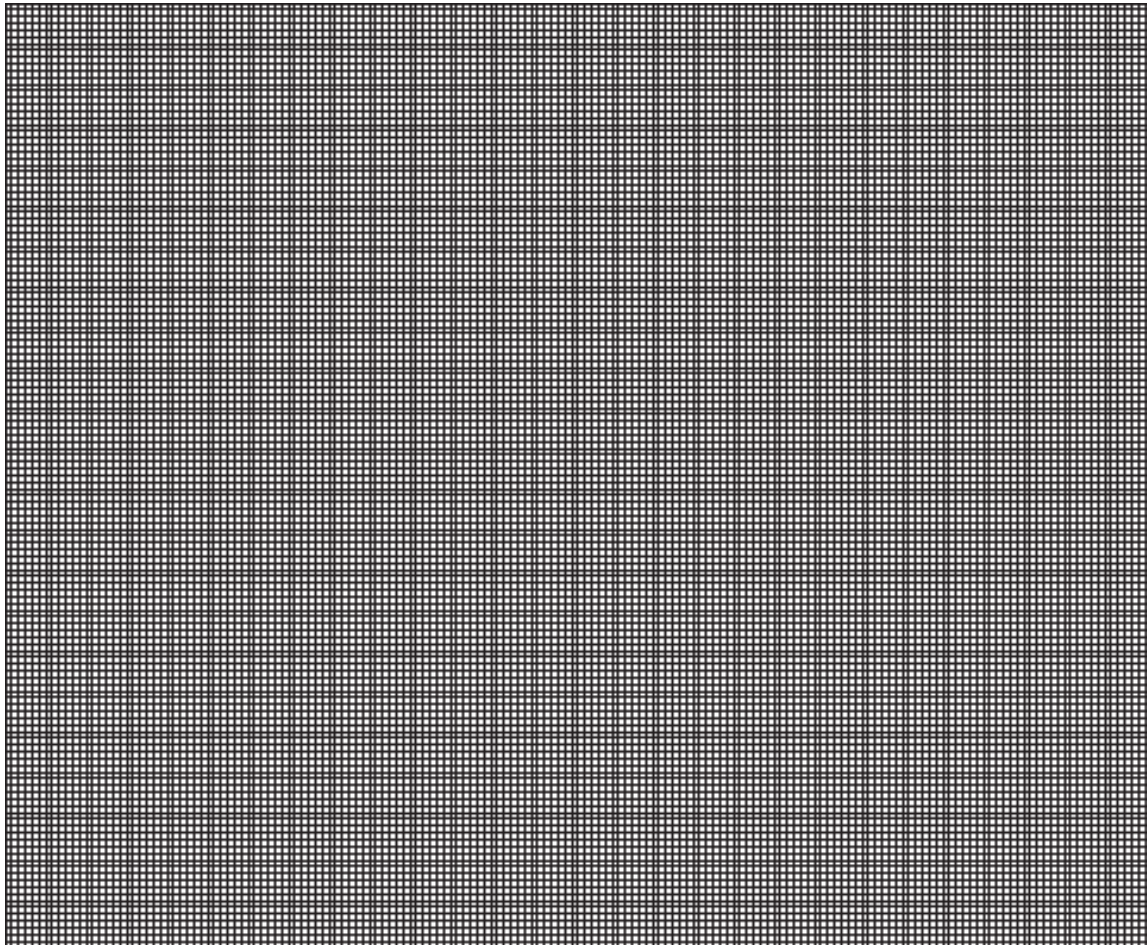
3. Solve graphically: X+Y=5 & Y = X+1

4. Solve graphically: $2X+Y-6=0$ & $2X-Y-2=0$

Theorems on Triangles

5. State and prove Basic proportionality theorem.(Thales theorem).

6. Prove that if two triangles are equiangular the their corresponding sides are in proportion.

7. State and prove Pythagoras theorem.

8. Prove that the ratio of areas of two similar triangles is equal to ratio of square on their correspoding sides.

Finding mean / median / mode

9. Calculate mean for the following frequency distribution

C.I.	0-10	10-20	20-30	30-40	40-50
f	5	8	14	9	4

10. Calculate mean for the following frequency distribution

X	12	17	22	27	32
f	2	3	5	3	2

11. Calculate median for the following frequency distribution

C.I.	0-10	10-20	20-30	30-40	40-50
f	5	12	20	9	4

12. Calculate mode for the following frequency distribution

C.I.	0-10	10-20	20-30	30-40
f	2	3	5	2

Ogive curves

13. Draw less than Ogive for the following information

C.I.	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
f	8	15	20	12	5
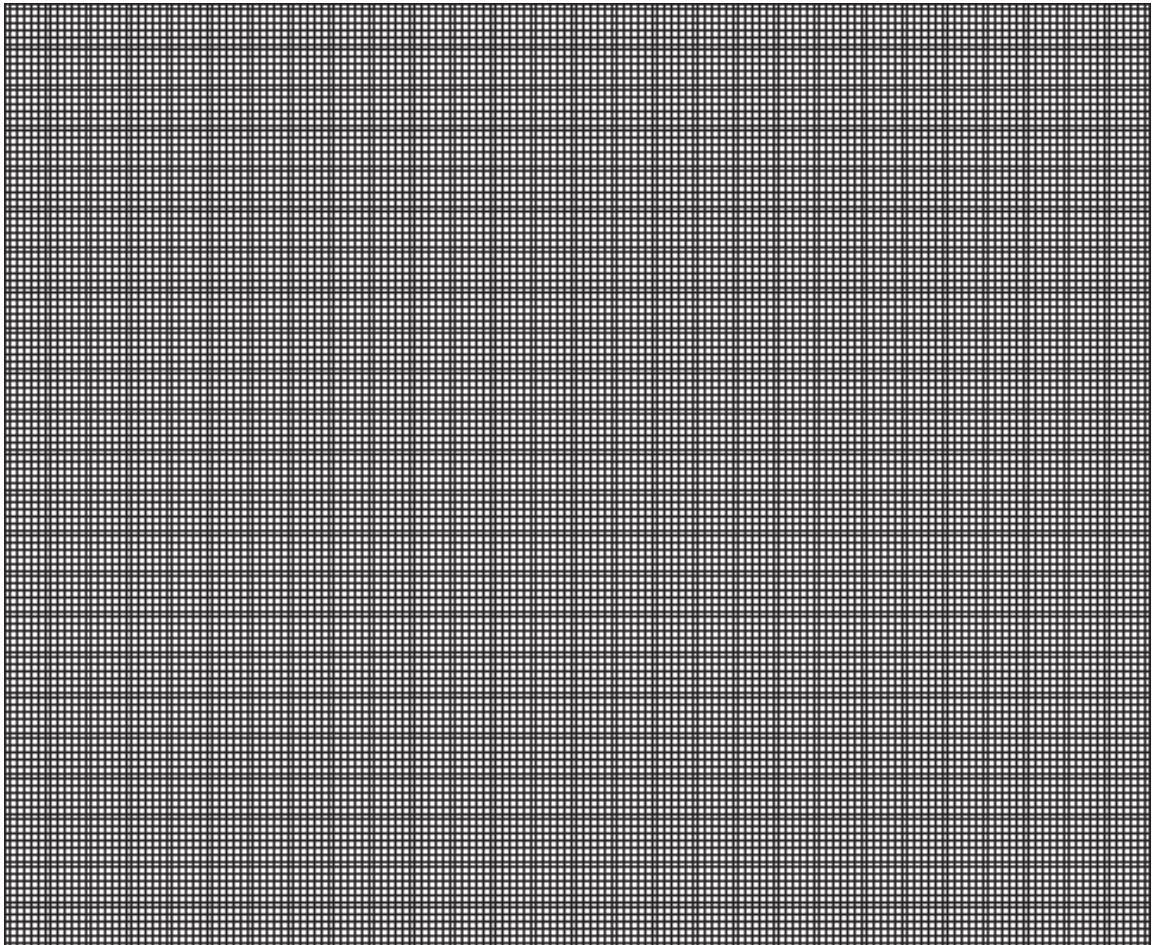
14. Draw more than Ogive for the following information

C.I	0-10	10-20	20-30	30-40	40-50
f	5	12	20	9	4
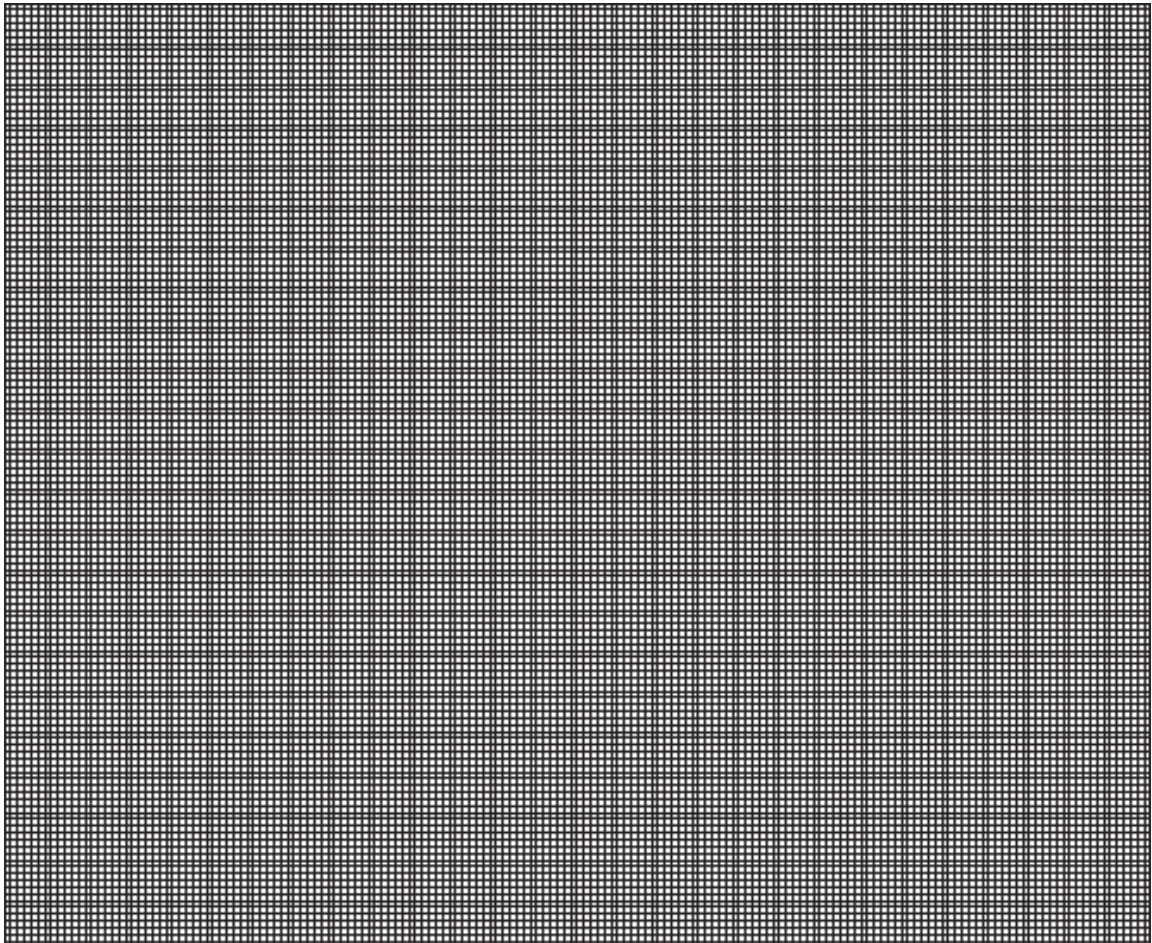
Construction of similar triangles

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

16. Draw a triangle for **BC = 6cm, AB = 5cm** & $\angle$**ABC = 60^0**, Construct a triangle similar to it whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle .

17. Draw a triangle for **AB=5cm , BC = 7cm , ∠B = 60⁰** . Construct a triangle similar to it whose sides are $\frac{5}{3}$ of the corresponding sides of the first triangle .

18. Draw a triangle for AB=6cm , $\angle A = 40^0$ & $\angle B = 70°$. Construct a triangle similar to it whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle .

19. Draw an equilateral triangle with side 5 cm and Construct a triangle similar to it whose sides are $\frac{4}{3}$ of the corresponding sides of the first triangle

<u>Theorems</u>

20. Prove that the tangents drawn from an external point to a circle are equal.

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

Construction of tangents

22. Draw a circle of radius 3.5cm and construct tangents from an external point 8cm away from centre.

23. Construct a tangent to a circle of radius 3 cm from a point on the concentric circle of radius 7 cm and measure its length.

24. Draw a circle of radius 3.5 cm and draw diameter in it. Construct tangents at the ends of the diameter.

25. Draw a line segment AB of length 8 cm . Taking A as centre draw a circle of radius 4 cm and taking B as centre draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

26. Draw a circle of radius 3.5cm and construct tangents which are inclined to each other at an angle of 60^0.

27. Draw a line segment of length 10cm and divide it in the ratio 2:3.

Solving quadratic equations

28. Solve: $3x^2 - 5x + 2 = 0$ by using formula

29. Solve: $2x^2 - 3x - 2 = 0$ by using formula

30. Solve: $2x^2 - 5x + 3 = 0$ by completing square method.

Probability

31. A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at *random* from the box, find the probability that it will be

(i) white?   (ii) blue?   (iii) red?

32. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at

i) 8   ii) an odd number   iii) number greater than 2

33. A die is thrown once. Find the probability of getting (i) a prime number; (ii) a number lying between 2 and 6 (iii) an odd number

34. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red?

35. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

36. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that
i) She will buy it ?   ii) she will not buy it?

37. What is the probability of an event E and 'not an event E'?

38. What is the probability of a sure event ?

39. What is the probability of an impossible event?

40. If P(E)=0.36 , find P(Ē).

Polynomials

41. Find the number of zeroes in each of the following given graphs.
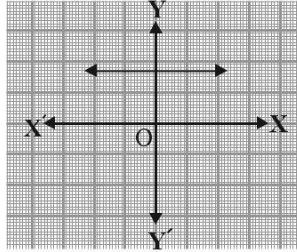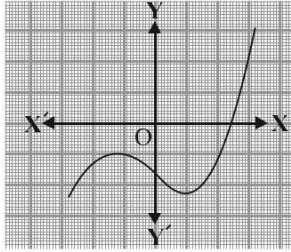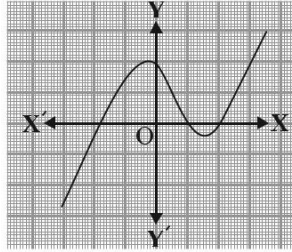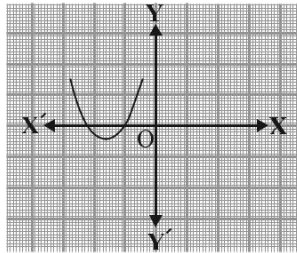

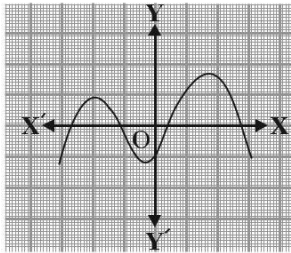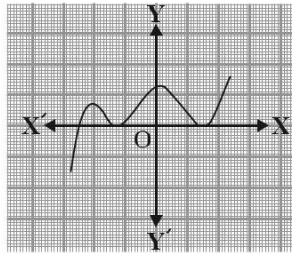(i)   (ii)   (iii)

(iv)   (v)   (vi)

42. If the sum and product of a quadratic polynomial are -3 & 2 respectively , find the quadratic polynomial.

43. If the sum and product of a quadratic polynomial are $\frac{1}{4}$ & -1 respectively , find the quadratic polynomial.

44. Find the quotient and remainder when $p(x) = 3x^3 - x^2 - 3x + 5$ is divided by $g(x) = x^2 + x - 1$

45. Find the quotient and remainder when $p(x) = x^4 - 3x^2 + 4x + 5$ is divided by $g(x) = x^2 + 1 - x$

46. Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$

47. α , β and γ are zeroes of the polynomial $3x^3 - 5x^2 - 11x - 3$, find the values of
    i)α+β+γ   ii)αβ+βγ+γα   iii) αβγ

48. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x) ,the quotient and remainder were
    x-2 and -2x+4 respectively, find g(x).

Real numbers

49. Find the HCF of 135 and 225 by using Euclid's division algorithm.

50.   Find the HCF and LCM of 42 and 120 by prime factorization.

51. Express 140 as product of primes.

52. Prove that $5 - \sqrt{3}$ is irrational.

Solving pair of linear equations in two variables

53. Solve the following pair of linear equations in two variables

      (i) $x + y = 14$ & $x - y = 4$

      (ii) $x + 3y = 9$ & $2x - y = 4$

(iii) $3x - 2y + 2 = 0$ & $5x + 3y = 22$

Nature of roots

54. **Find the value of the discriminant for $2x^2 - 6x + 3 = 0$**

55. Determine the nature of roots for $2x^2 - 3x + 5 = 0$

56. For what value of k the roots of $2x^2 + kx + 3 = 0$ **are equal.**

Coordinate Geometry

57. Find the distance between the origin and a point (-8 ,6).

58. Find the point on X-axis which is equidistant from the points (2,-5) & (-2,9).

59. Find the point on Y-axis which is equidistant from the points (6,5) & (-4,3).

60. Find the relation between x and y such that the point (x,y) is equidistant from the points (7,1) & (3,5).

61. If the distance between (2,-3) and (10,y) is 10 units , find the value of   y.

62. Find the mid point of line joining the points (4,-3) and (8,5).

63. In what ratio does the point (-4,6) divides the line joining the points (-6 ,10) and (3,-8).

64. Find the area of a triangle whose vertices are (-5,-1) , (3,-5) and (5,2)

65. Find the value of k if the points (7,-2) , (5,1) and (3,k) are collinear.

66. The midpoints of sides AB, BC and AC of ∆ABC   are $(3,1)$, $(5,6)$ and $(-3,2)$ respectively , find the area of ∆ABC.

Trigonometric ratios for some specific angles

θ	0°	30°	45°	60°	90°
Sin	0	$\dfrac{1}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{\sqrt{3}}{2}$	1
Cos	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{1}{2}$	0
Tan	0	$\dfrac{1}{\sqrt{3}}$	1	$\sqrt{3}$	ND
Cot	ND	$\sqrt{3}$	1	$\dfrac{1}{\sqrt{3}}$	0
Sec	1	$\dfrac{2}{\sqrt{3}}$	$\sqrt{2}$	2	ND
Cosec	ND	2	$\sqrt{2}$	$\dfrac{2}{\sqrt{3}}$	1

Surface areas and volumes

Name of the solid	Figure	Volume	Lateral/Curved Surface Area	Total Surface Area
Cuboid		lbh	$2lh + 2bh$ or $2h(l+b)$	$2lh+2bh+2lb$ or $2(lh+bh+lb)$
Cube		a^3	$4a^2$	$4a^2+2a^2$ or $6a^2$
Right circular cylinder		$\pi r^2 h$	$2\pi rh$	$2\pi rh + 2\pi r^2$ or $2\pi r(h+r)$
Right circular cone		$\frac{1}{3}\pi r^2 h$	πrl	$\pi rl + \pi r^2$ or $\pi r(l+r)$
Sphere		$\frac{4}{3}\pi r^3$	$4\pi r^2$	$4\pi r^2$
Hemisphere		$\frac{2}{3}\pi r^3$	$2\pi r^2$	$2\pi r^2+\pi r^2$ or $3\pi r^2$