

Police DAV Public School, Ludhiana
Class-X/Mathematics
Chapter - Polynomials

1. Find the zeroes of the polynomial $p(x) = 4x^2 - 12x + 9$
2. What is the sum of the zeroes of the polynomial $p(x) = 5x^2 - 7x + 2$ is
3. Write quadratic polynomial whose zeros are -3 and 4
 - a. (a) $x^2 - x + 12$ (b) $x^2 + x + 12$ (c) $\frac{x^2}{2} - \frac{x}{2} - 6$ (d) $2x^2 + 2x - 24$
 - i. $\frac{q^2 - pr}{p^2}$ (b) $\frac{q^2 - 2pr}{p}$ (c) $\frac{q^2 + 2pr}{q^2}$ (d) $\frac{q^2 - 2pr}{p^2}$
4. If α, β and γ are zeroes of the polynomial $f(x) = px^3 + qx^2 + rx + s$, then find $\alpha^2 + \beta^2 + \gamma^2$
5. If α, β are zeroes of the polynomial $p(x) = 2x^3 - 7x + 3$, find the value of $\alpha^2 + \beta^2$.
6. If one zero of the polynomial $p(x) = (a^2 + 4)x^2 + 13x + 4a$ is reciprocal of the other, then find the value of a .
7. If the product of two zeroes of the polynomial $p(x) = 2x^3 + 6x^2 - 4x + 9$ is 3, then find its third zero.
8. If one zero of the polynomial $p(x) = 5x^2 + 13x - a$ is reciprocal of the other, find the value of a .
9. On dividing $3x^3 - 2x^2 + 5x - 5$ by a polynomial $p(x)$, the quotient and the remainder are $x^2 - x + 2$ and -7 respectively. Find $p(x)$.
10. Find the value of k for which the polynomial $x^4 + 10x^3 + 25x^2 + 15x + k$ is exactly divisible by $x + 7$.
11. Find all the zeroes of the polynomial $2x^4 + 5x^3 - 11x^2 + 20x + 12$, if it is given that two of its zeroes are 2 and -2 .
12. Find all the zeroes of the polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if it is given that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.
13. Obtain all the zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{5}/3$ and $-\sqrt{5}/3$
14. What must be subtracted from $4x^4 + 2x^3 - 8x^2 + 3x - 7$ so that it may be exactly divisible by $2x^2 + x - 2$?
15. What must be added to $6x^5 + 5x^4 + 11x^3 - 3x^2 + x + 5$ so that it may be exactly divisible by $3x^2 - 2x + 4$?
16. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$ the remainder comes out to be $x + a$. Find the values of k and a .
17. If α and β are the zeroes of a quadratic polynomial $f(x) = x^2 - 3x - 2$. Find a quadratic polynomial whose zeroes are $1/2\alpha + \beta$ and $1/2\beta + \alpha$.
18. Find the zeroes of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$. Verify the relationship coefficients are zeroes.
19. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $(ax + b)$, find a and b .
20. If two zeroes of the polynomial $x^3 - 4x^2 - 3x + 12$, $\sqrt{3}$ and $-\sqrt{3}$, then find its third zero.
21. If α and β are the zeroes of quadratic polynomial $f(x) = x^2 - p(x+1) - c$. Show that $(\alpha+1)(\beta+1) = 1 - c$.

QUADRATIC EQUATIONS

22. What will be the nature of roots of quadratic equation $2x^2 + 4x - 7 = 0$?
23. If $1/2$ is a root of the equation $x^2 + hx - 5/4 = 0$, then find the value of k .
24. If a and b are the roots of the equation $x^2 + ax - b = 0$, then find a and b .
25. Find the discriminant of the quadratic equation $4\sqrt{2}x^2 + 8x^2\sqrt{2} = 0$.

26. Find the value of k for which the equation $x^2+k(2x+k-1)+2=0$ has real and equal roots.
27. If -5 is a root of the quadratic equation $2x^2+px-15=0$ and the quadratic equation $p(x^2+x)+k=0$ has equal roots, then find the value of k .
28. Does there exist a quadratic equation whose co-efficients are rational but both of its roots are irrational? Justify your answer.
29. Write the set of values of k for which the quadratic equation $2x^2+kx+8=0$ has real roots.
30. Solve the quadratic equation $2x^2+ax-a^2=0$ for x .
31. Find the roots of the quadratic equation $2x^2+7x+5=0$
32. A two digit number is four times the sum of the digits. It is also equal to 3 times the product of digits. Find the number.
33. Find the value of p , for which one root of the quadratic equation $px^2-14x+8=0$ is 6 times the other.
34. If $ad \neq bc$, then prove that the equation $(a^2+b^2)x^2+2(ac+bd)x+(c^2+d^2)=0$ has no real roots.
35. Using quadratic formula solve the following quadratic equation: $p^2x^2+(p^2-q^2)x-q^2=0$
36. If the roots of the quadratic equation $(a-b)x^2+(b-c)x+(c-a)=0$ are equal, prove that $2a=b+c$.
37. If the equation $(1+m^2)x^2+2mcx+c^2-a^2=0$ has equal roots, show that $c^2=a^2(1+m^2)$
38. If $\sin \theta$ and $\cos \theta$ are roots of the equation $ax^2+bx+c=0$, prove that $a^2-b^2+2ac=0$
39. Solve for x ; $2 \left\{ \begin{matrix} 2x-1 \\ x+3 \end{matrix} \right\} - 3 \left\{ \begin{matrix} x+3 \\ 2x-1 \end{matrix} \right\} = 5; x \neq 3, \frac{1}{2}$
40. If the roots of the equation $(c^2-ab)x^2-2(a^2-bc)x+b^2-ac=0$ in x are equal, then show that either $a=0$ or $a^3+b^3+c^3=3abc$.
41. 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 $a=b=c$.
42. Using quadratic formula, solve the following equation for x : $abx^2+(b^2-ac)x-bc=0$
43. 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.
44. One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels
45. Solve for x : $\frac{1}{a+b+x} + \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$; $a+b=x \neq 0, a, b, x \neq 0$.

LINEAR EQUATIONS IN TWO VARIABLE

46. What type of lines will you get by drawing the graph of the equations $x-2y+3=0$ and $2x-4y+5=0$?
47. How many solutions will be obtained by solving the pair of equations $x+3y-2=0$ and $2x-5y+1=0$?
48. For the pair of equations $3x+y=1$ and $(2k-1)x+(k-1)y=2k+1$ to be inconsistent, find the value of k .
49. Write the condition that the pair of $2x+3y=7$ and $(m+n)x+(2m-n)y=4$ represent the coincident lines.
50. Find the values of α and β so that the pair of equations $(2\alpha-1)x+3y-5=0$ and $3x+(\beta-y)-2=0$ has infinite number solutions.

51. Find the value of k for which the pair of linear equations $(3k+1)x + 5y - 2 = 0$ and $(k^2+1)x + (k-2)y - 5 = 0$ have no solution ?
52. Solve each of the following pair of linear equations by elimination method
 $ax+by=1$, $bx + ay = 2ab/a^2+b^2$
53. By cross multiplication method solve each of the following pair of linear equations $ax+by=a-b$, $bx-ay = a+b$
54. Solve each of the following pair of linear equations
- $\frac{4y-6x}{xy} = 1$, $3y+4x = 5xy$
 - $\frac{10}{x+y} + \frac{4}{y-x} = -2$, $\frac{15}{x+y} - \frac{7}{y-x} = 10$
 - $a(x+y)+b(x-y)-(a^2-ab+b^2)=0$
 $a(x+y)-b(x-y)-(a^2-ab+b^2)=0$
55. For which value of k will the following pair of linear equations have no solution ?
 $3x+y=1$
 $(2k-1)x+(k-1)y=2$
56. For what values of a and b does the following pair of linear equations have an infinite number of solutions
 $2x+3y=7$
 $(a-b)x+(a+b)y=3a+b-2$
57. Find the values of k for which the pair of linear equations
 $kx-y=2$, $6x-2y=3$ has (i) a unique solution (ii) no solution
 Is there any value of k for which the pair of equations, has infinitely many solutions ?
58. Determine the value of k for which the following pair of linear equations has no solution :
 $(3k+1)x + 3y - 2 = 0$
 $(k^2+1)x + (k-2)y - 5 = 0$
59. The ten's digit of a number is twice the unit's digit. The number obtained on interchanging the digits is 36 less than the original number. Find the original number.
60. A fraction becomes $9/11$ if 2 is added to both the numerator and the denominator. If 3 is added to both the numerator and the denominator it becomes $5/6$. Find the fraction.
61. Three years ago the age of a mother was five times the age of her daughter and 2 years hence she will be thrice as old as her daughter will be. Find their present ages.
62. 2 women and 4 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work and also the time taken by 1 man alone to finish it.
63. A boat goes 30 km upstream and 44 km downstream in 10 hours. It can go 40 km upstream and 55 km downstream in 13 hours. Find the speed of the stream and that of the boat in still water.
64. A person travels 600 km to his home, partly by train and partly by car. He takes 8 hours if he travels 120 km by train and the rest by car. He takes 20 minutes longer if he travels 200 km by train and the rest by car. Find the speeds of the train and the car.

ACTIVITY

1. Draw flow chart of chapter polynomials.
2. Find the coordinates(x, y) of various landmarks of Ludhiana i.e. DMC, Rose garden, PDAV, Guru Nanak Stadium. Plot on graph, join to form a quadrilateral and find area.
3. Obtain the conditions for consistency of a system of linear equations in two variables graphically.

i. $X - y + 1 = 0$

$$3x + 2y - 12 = 0$$

ii. $X - 2y - 5 = 0$

$$2x - 4y - 6 = 0$$

iii. $X + 2y - 5 = 0$

$$3x + 6y - 10 = 0$$

Fill the table:

Types of lines	a_1/b_1	a_2/b_2	a_3/b_3	observation	Nature of solution
Intersecting					
Parallel					
Coincident					