

Vikas - The Concept School

Class X

Mathematics

Topics: Real numbers and polynomials

1. Express the GCD of 48 and 18 as $48x+18y$
2. Prove that one of every three consecutive integers is divisible by 3.
3. If d is the HCF of 30, 72, find the value of x & y satisfying $d = 30x + 72y$.
4. Show that the product of 3 consecutive positive integers is divisible by 6.
5. Find the greatest number of 6 digits exactly divisible by 24, 15 and 36.
6. If $7 \times 5 \times 3 \times 2 + 3$ is composite number? Justify your answer
7. Prove that $\sqrt{2} + \sqrt{5}$ is irrational
8. Two numbers are in the ratio 15: 11. If their HCF is 13 and LCM is 2145 then find the numbers
9. Write the HCF of smallest composite number and smallest prime number
10. Write whether $(2\sqrt{45} + 3\sqrt{20}) / 2\sqrt{5}$ on simplification gives a rational or an irrational number
11. For some integer m , show that every even integer is of the form $2m$
12. Show that $n^2 - 1$ is divisible by 8, if n is an odd integer
13. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then find HCF (a, b)
14. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then find LCM (p, q)
15. Can two numbers have 18 as their HCF and 380 as their LCM? Why?
16. For any positive integer n , prove that $n^3 - n$ is divisible by 6
17. On a morning walk, three persons step off together and their steps measure 40cm, 42cm, and 45 cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?
18. Show that 12^n cannot end with digit 0 or 5 for any natural number
19. Prove that if x and y are both odd positive integers, then $x^2 + y^2$ is even but not divisible by 4
20. Find the largest positive integer that will divide 122, 150 and 115 leaving remainder 5, 7 and 11 respectively
21. Show that there is no positive integer n for which $\sqrt{n-1} + \sqrt{n+1}$ is rational.
22. Using prime factorization method, find the HCF and LCM of 72, 126 and 168. Also show that HCF \times LCM \neq product of three numbers.
23. Three sets of English, Mathematics and Science books containing 336, 240 and 96 books respectively have to be stacked in such a way that all the books are stored subject wise and the height of each stack is the same. How many stacks will be there?
24. Write whether the rational number $13/2500$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion.
25. The decimal expansion of the rational number $43/2^4 5^3$ will terminate after how many places of decimals?
26. A person wanted to distribute 96 apples and 112 oranges among poor children in an orphanage. He packed all the fruits in boxes in such a way that each box contains fruits of the same variety, and also every box contains an equal number of fruits. (i) Find the maximum number of boxes in which all the fruits can be packed. (ii) Which values of this person have been reflected in above situation?

27. What must be subtracted from the polynomial $(x) = x^4 + 2x^3 - 13x^2 - 12x + 21$, so that the resulting polynomial is exactly divisible by $x^2 - 4x + 3$?
28. If the sum of squares of the zeroes of the polynomial $6x^2 + x + k$ is $25/36$. find the value of k ?
29. If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx - 9$ is negative of the other, then find the value of k ?
30. Find the values of k for which the quadratic polynomial $9x^2 - 3kx + k$ has equal zeroes
31. On dividing $3x^3 - 2x^2 + 5x + 5$ by the polynomial $p(x)$, the quotient and remainder are $x^2 - x + 2$ and -7 respectively Find $p(x)$?
32. If α, β are zeroes of the quadratic polynomial $p(x) = x^2 - (k - 6)x + (2k + 1)$. Find the value of k if $\alpha + \beta = \alpha\beta$.
33. If the zeroes of the polynomial $x^2 - 5x + k$ are the reciprocal of each other, then find the value of k ?
34. If α and β are zeroes of the quadratic polynomial $x^2 - 6x + a$, find the value of 'a' if $3\alpha + 2\beta = 20$.
35. On dividing $3x^3 + 4x^2 + 5x - 13$ by a polynomial $g(x)$, the quotient and remainder are $3x + 10$ and $16x - 43$ respectively. Find the polynomial $g(x)$.
36. Check whether $x^2 + 3x + 1$ is a factor of $3x^4 + 5x^3 - 7x^2 + 2x + 2$?
37. If α, β and γ are zeroes of the polynomial $6x^3 + 3x^2 - 5x + 1$, then find the values of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$.
38. If α and β are the zeroes of $6x^2 + x - 2$, find $\alpha/\beta + \beta/\alpha$
39. If one of the zeroes of the polynomial $2x^2 + px + 4 = 0$ is 2, find the other zero, also find the value of p
40. If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is reciprocal of the other. Find the value of a
41. Let α and β are the zeroes of a quadratic polynomial $2x^2 - 5x - 6$ then form a quadratic polynomial whose zeroes are $\alpha + \beta$ and $\alpha\beta$.
42. Find the value of zeroes of the polynomials $p(x)$ as shown in the graph and hence find the polynomial.

