MATHEMATICS

(Real Number, Linear Equation, Polynomial, Quadratic Equation)

CLASS-X

General instructions:

(i)All the questions are compulsory.
(ii) The question paper consists of 47 questions divided into 4 sections A, B, C, and D.
(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 9 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 10 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choice has been provided .You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION-A

1) The decimal expansion of 14/120 will terminate after how many places of decimals?

(a) 1

(b) 2

(c) 3

(d) will not terminate

2) If the zeroes of the quadratic polynomial $x^2 + (a + 1)\,x + b$ are 2 and –3, then:

(a) $a = -7, b = -1$

(b) $a = 5, b = -1$

(c) $a = 2, b = -6$

(d) $a = 0, b = -6$

3) Which of the following is not a solution of the pair of equations $3x - 2y = 4$ and $6x - 4y = 8$?

(a) $x = 2, y = 1$

(b) $x = 4, y = 4$

(c) $x = 5, y = 3$

(d) $x = 6, y = 7$

4) Which of the following is not a quadratic equation:

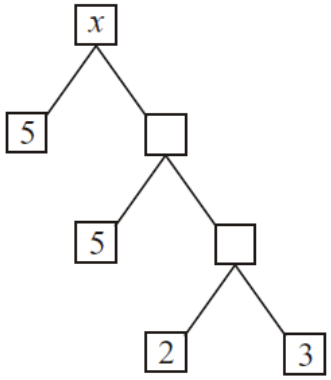
(a) $(x - 2)^2 + 1 = 2x - 3$

(b) $x\,(x + 1) + 8 = (x + 2)\,(x - 2)$

(c) $x\,(2x + 3) = x^2 + 1$

(d) $(x + 2)^3 = x^3 - 4$

5) The value of x in the factor tree is:



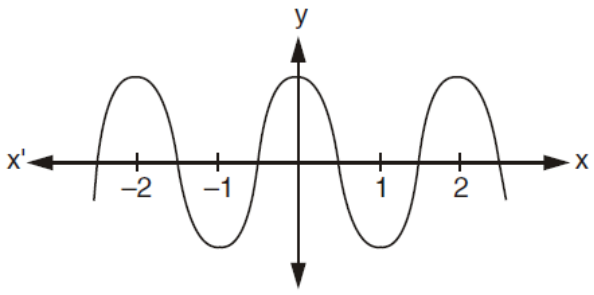
(a) 30

(b) 150

(c) 100

(d) 50

6) The graph of $y = f(x)$, where $f(x)$ is a polynomial in x is given below. The number of zeroes lying between –2 to 0 of $f(x)$ is



(a) 3 (b) 6 (c) 2 (d) 4

7) If $p(x) = 2x^2 – 3x + 5$, then $p(–1)$ is equal to:

(a) 10 (b) 8 (c) 9 (d) 7

8) The pair of equations $y = 0$ and $y = –7$ has:

(a) one solution

(b) no solutions

(c) infinitely many solutions

(d) two solutions

9) If $kx^2 – 2x + 1 = 0$ and $2x^2 – kx - 1 = 0$ have equal discriminants, then the value of k is:

(a) 1

(b) 2

(c) – 2

(d) 3

10) The LCM of smallest two-digit composite number and smallest composite number is

(a) 12

(b) 4

(c) 20

(d) 44

11) Given that HCF (2530, 4400) =110 and LCM (2530, 4400) =253×K, find the value of K?

12) Find the quadratic polynomials whose zeros are $2+\sqrt{3}$ *and* $2-\sqrt{3}$

13 Find the area of the triangle formed by the line x=3, y=4 and x=y?

14 Write whether the following statement is true or false. Justify your answer. If the coefficient of x^2 and the constant term of a quadratic equation have opposite signs, then the quadratic equation has real roots

15) If 0.2316 is expressed in the form of $p/2^n \times 5^m$ for smallest values of whole number n and m. Write these values of n and m

16) A polynomial of degree 7 is divided by a polynomial of degree 4. What is the degree of the quotient?

17)If $1+\sqrt{2}$ is a root of quadratic equation with rational coefficients. Write the other roots

18)If one roots of quadratic equation $4x^2-2x+(\alpha-4)$ be reciprocal of other. Find the value of α?

19)If a+b+c=0 then zeros of quadratic polynomials $ax^2+bx+c=0$?

20)Find the least no divisible by all the natural number 1 to 10(both inclusive)

SECTION-B

21)Use Euclid's algorithm to find the HCF of 615 and 154.

22)Find the zeroes of the polynomial $p(x) = 4\sqrt{3}\,x^2+5x-2\sqrt{3}$ and verify the relationship between the zeroes and the coefficients.

23)Solve:148x+231y=527,231x+148y=610

(Or)

Solve for x and y: $2^{x+y} = 2^{x-y} = \sqrt{8}$

24) For what value of *k* does $(k-12)x^2 + 2(k-12)x + 2 = 0$ have equal roots?

25) On dividing $3x^3+4x^2+5x+93$ by a polynomial g(x) the quotient and remainder were 3x+10 and -7-5x respectively, find the polynomial g(x).

26) If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3 b$; a, b being prime numbers, then find the LCM and HCF (p, q).

(Or)

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 the HCF and LCM (a, b).

27) If 5 pens and 6 pencils together cost Rs.9and 3 pens and 2 pencils cost Rs.5. Find the cost of a pen and a pencil

28)Solve for x: $\frac{4}{x} - 3 = \frac{5}{2x+3}$

29) If –4 is a root of the quadratic equation $x^2 + px - 4 = 0$ and the equation $2x^2 + px + k = 0$ has equal roots, find the value of *k*.

SECTION-C

30)Solve: (a+2b) x+(2a-b) y=2 and (a-2b) x+(2a+b) y =3

31)Find the largest number that will divide 546, 437 and 4000 leaving remainders 19, 12 and 5 respectively

32) For what values of *a* and *b* does the following pair of linear equations have an infinite number of solutions: $2x + 3y = 7$; $a(x + y) - b(x - y) = 3a + b - 2$.

33)Solve: $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{(3x+9)}{(x-3)(2x+3)} = 0 \; where \; x \neq 3, -\frac{3}{2}$

(Or)

Solve: $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$

34) If the polynomial $x^4 + 2x^3 + 8x^2 + 12x + 18$ is divided by another polynomial $x^2 + 5$, he remainders comes out to be px + q. Find the values of p and q.

35)Solve: $\frac{1}{3x+2y} - \frac{1}{3x-2y} = \frac{1}{8} \; and \; \frac{3}{3x+2y} - \frac{1}{3x-2y} = \frac{1}{2} \; ; 3x - 2y, 3x + 2y \neq 0$

(Or)

$$\frac{10}{x+y} + \frac{2}{x-y} = 4 \; and \; \frac{15}{x+y} - \frac{5}{x-y} = -2 \; ; x + y, x - y \neq 0$$

36) Prove that the equation $x^2(a^2 + b^2) + 2x(ac + bd) + (c^2 + d^2) = 0$ has no real root, if $ad \neq bc$

37)Show that every positive odd integer is of the form 6q + 1 or 6q + 3 or 6q + 5 where q is some integer.

(Or)

Show that any positive even integer in the form 4q, or 4q + 2 where q is some integer.

38) Sum of the areas of two squares is 468 sm. If the difference of their perimeters is 24 m, find the sides of the two squares

39) Apply division algorithm to find the quotient g(x) and remainder r(x) on dividing f(x) = x^3-x^2+4x-8, by g(x)=x+3also verify the division algorithms

SECTION-D

40)A takes 3 hours more than B to walk 30km.But A double his speed, he ahead by B $1\frac{1}{2}$ hours. Find their speed of walking?

41)A swimming pool is filled with three pipes with uniform flow. The first two pipes operating simultaneously fill the same pool in the same timing, during which the pool is filled by the third pipe alone. The second pipe fills the pool 5 hours faster than the first pipe and 4 hours slower than third pipe. Find the time required by each pipe to fill the pool separately

42) Use a single graph paper to draw the graphs of $x + y = 7$, $2x – 3y + 1 = 0$ and

$3x – 2y – 1 = 0$. Obtain the vertices of the triangle so obtained.

43) At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Find the present ages of both Asha and Nisha.

(Or)

A person on tour has Rs 360 for his daily expenses. If he extends his tour for four days, he has to cut down his daily expenses by Rs 3. Find the original duration of the tour

44) Obtain all the zeroes of $x^4 + 5x^3 – 2x^2 – 40x – 48$ if two of its zeroes are $2\sqrt{2}$ and $-2\sqrt{2}$

(Or)

Find the zeroes of the polynomial p(x) = $x^3– 2x^2 – 49x + 98$ if its two zeroes are equal in magnitude but opposite in sign.

45) If α and β zeros of the polynomials p(x) = $3x^2 +5x -7$. Then calculate

a) $1/\alpha + 1/\beta$ b) $1/\alpha^2 + 1/\beta^2$ c) $1/\alpha^3+1/\beta^3$

46)Show that one and only one out of n, n + 2 and n + 4 is divisible by 3, where n is any positive integer.

47)Prove that$\sqrt{5}$ is irrational and hence prove that 2 $(3+2\sqrt{5})^2$ is irrational