Mathematics

Sample Question Paper 2

(Class 10) (Term – 1) (Session 2021-22)

Time: 1 hour 30 minutes **Number of Questions: 40**

General Instructions

1. The Question Paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based on Two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

SECTION – A

Section - A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

1. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is
(A) 13 (B) 65
(C) 875 (D) 1,750

2. If two positive integers p and q can be expressed as $p=ab^2$ and $q=a^3b$; a, b being prime numbers, then LCM (p, q) is
(A) ab (B) a^2b^2
(C)a^3b^2 (D) a^3b^3

3. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is-1, then the product of the other two zeroes is
(A) b – a + 1 (B) b – a – 1
(C) a – b + 1 (D) a – b – 1

4. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are
(A) Both positive (B) Both negative
(C) One positive and one negative (D) Both equal

5. The zeroes of the quadratic polynomial $x^2 + kx + k$, $k \neq 0$,
(A) Cannot both be positive (B) Both cannot be negative
(C) Are always unequal (D) Are always equal

6. The pair of equations $x + 2y + 5 = 0$ and $– 3x – 6y + 1 = 0$ have
(A) A unique solution (B) Exactly two solutions
(C) Infinitely many solutions (D) No solution

7. If a pair of linear equations is consistent, then the lines will be
(A) Parallel (B) Always coincident
(C) Intersecting or coincident (D) Always intersecting

8. For what value of k, do the equations $3x – y + 8 = 0$ and $6x – ky = – 16$ represent coincident lines?
(A) 1/2 (B) –1/2
(C) 2 (D) –2

9. The points (-4, 0), (4, 0) and (0, 3) are the vertices of a
(A) Right triangle (B) Isosceles triangle
(C) Equilateral triangle (D) Scalene triangle

10. If in triangles DEF and PQR, ∠D= ∠Q and ∠R =∠E, then which of the following is not true?

(A) EF/PR = DF/PQ
(B) DE/PQ = FE/RP
(C) DE/QR = DF/PQ
(D) EF/RP = DE/QR

11. In triangles ABC and DEF, ∠B = ∠E = ∠F = ∠C and AB = 3DE. Then, the two triangles are:

(A) Congruent but not similar
(B) Similar but not congruent
(C) Neither congruent nor similar
(D) Congruent as well as similar.

12. The value of the expression: $\frac{\sin^2 22° + \sin^2 68°}{\cos^2 22° + \cos^2 68°} + \sin^2 63° + \cos 63° \sin 27°$ is

(A) 3
(B) 2
(C) 1
(D) 0

13. If 4 tan θ = 3, then $\frac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}$ is equal to

(A) 2/3
(B) 1/2
(C) 1/3
(D) 3/4

14. If $\cos A = \frac{4}{5}$ then the value of tan A is

(A) 3/5
(B) 3/4
(C) 4/3
(D) 1/8

15. If $\sin A = \frac{1}{2}$ then the value of cot A is

(A) $\sqrt{3}$
(B) $\frac{1}{\sqrt{3}}$
(C) $\frac{\sqrt{3}}{2}$
(D) 1

16. Given that $\sin\theta = \frac{a}{b}$ then cos θ is equal to

(A) $\frac{b}{\sqrt{b^2 - a^2}}$
(B) $\frac{b}{a}$
(C) $\frac{\sqrt{b^2 - a^2}}{b}$
(D) $\frac{a}{\sqrt{b^2 - a^2}}$

17. Area of the largest triangle that can be inscribed in a semi-circle of radius 'r' units is

(A) r^2 sq. units
(B) $\frac{1}{2}r^2$ sq. units
(C) $2r^2$ sq. units
(D) $\sqrt{2}r^2$ sq. units

18. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is

(A) 22:7
(B) 14:11
(C) 7:22
(D) 11:14

19. It is proposed to build a single circular park equal in area to the sum of areas of two circular parks of diameters 16 m and 12m in a locality. The radius of the new park would be

(A) 10 m (B) 15 m

(C) 20 m (D) 24 m

20.The area of the square that can be inscribed in a circle of radius 8 cm is

(A) 256 cm^2 (B) 128 cm^2

(C) $64\sqrt{2}$ cm^2 (D) 64 cm^2

SECTION – B

Section - B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

21. If the probability of an event is p, then the probability of complementary event will be

(A) $p - 1$ (B) p

(C) $1 - p$ (D) $1-\frac{1}{p}$

22. The Probability expressed as a percentage of a particular occurrence can never be

(A) Less than 100 (B) Less than 0

(C) Greater than 0 (D) Anything but a whole number.

23. If a card is selected from a deck of 52, then the Probability of its being a red face card is

(A) 3/26 (B) 3/13

(C) 2/13 (D) 1/2

24. The product of a non-zero rational and an irrational number is

(A) Always irrational (B) Always rational

(C) Rational or irrational (D) One.

25. The number 1.732 is

(A) An irrational number (B) A rational number

(C) An integer (D) A whole number.

26. 2.1311 3111,311113..... is

(A) An integer (B) A rational number

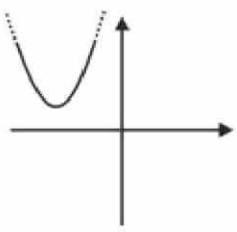
(C) An irrational number (D) None of these.

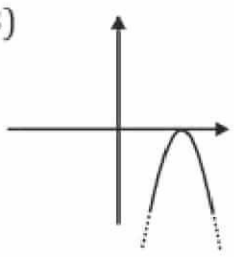
27. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after

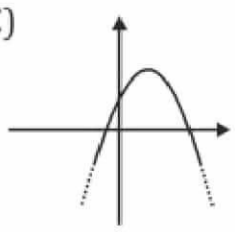
(A) One decimal place (B) Two decimal places

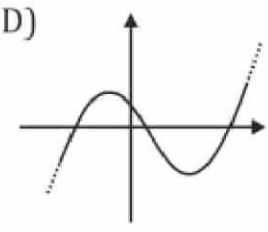
(C) Three decimal places (D) Four decimal places.

28. Which of the following is not the graph of a quadratic polynomial?

(A) 

(B) 

(C) 

(D) 

29. One equation of a pair of dependent linear equations is $-5x + 7y = 2$. The second equation can be
(A) $10x + 14y + 4 = 0$ (B) $-10x - 14y + 4 = 0$
(C) $-10x - 14y + 4 = 0$ (D) $10x - 14y = -4$

30. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then the value of k is
(A) $-5/4$ (B) $2/5$
(C) $15/4$ (D) $3/2$

31. The larger of two supplementary angles exceed the smaller by 18°, then the angles are
(A) 99°, 81° (B) 98°, 82°
(C) 97°, 83° (D) None of these

32. The value of $9 \sec^2 A - 9 \tan^2 A$ is
(A) 1 (B) 9
(C) 8 (D) 0

33. The value of $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta)$ is
(A) 0 (B) 1
(C) 2 (D) –1

34. The value of $(\sec A + \tan A)(1 - \sin A)$ is
(A) sec A (B) sin A
(C) cosec A (D) cos A

35. If P(A) denotes the probability of an event A, then
(A) $P(A) < 0$ (B) $P(A) > 1$
(C) $0 \leq P(A) \leq 1$ (D) $-1 \leq P(A) \leq 1$

36. The probability that a non-leap year selected at random will contain 53 Sundays is
(A) 1/7 (B) 2/7
(C) 3/7 (D) 5/7

37. Aroona has only ₹ 1 and ₹ 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is ₹ 75, then the number of ₹ 1 and ₹ 2 coins are, respectively
(A) 35 and 15 (B) 35 and 20
(C) 15 and 35 (D) 25 and 25

38. If $2x + y = 23$ and $4x - y = 19$, then the values of $(5y = 2x)$ and $(\frac{y}{x} - 2)$ are
(A) 30, 5/7 (B) 31, –5/7
(C) 32, 5/7 (D) None of these

39. $\frac{1}{\sqrt{2}}$ is a/an
(A) Fraction (B) Rational number
(C) Irrational number (D) None of these

40. The decimal expansion of the sum of rational numbers 15/4 and 5/40 will terminate after
(A) One decimal place (B) Two decimal places
(C) Three decimal places (D) Four decimal places

SECTION – C

Section - C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

Q. 41 – Q. 45 are based on Case Study – 1
Case Study – 1

A garden consists of 135 rose plants planted in certain number of columns. There is another set of 225 marigold plants, which is to be planted in the same number of columns.

41. What is the maximum number of columns in which they can be planted?
(A) 45 (B) 40
(C) 15 (D) 35

42. Find the total number of plants
(A) 135 (B) 225
(C) 360 (D) 45

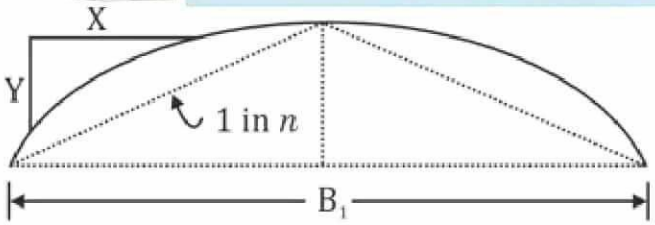
43. Find the sum of exponents of the prime factors of the maximum number columns in which they can be planted.
(A) 5 (B) 3
(C) 4 (D) 6

44. What is total numbers of row in which they can be planted?
(A) 3 (B) 5
(C) 8 (D) 15

45. Find the sum of exponents of the prime factors of total number of plants.
(A) 2 (B) 3
(C) 5 (D) 6

Q. 46 – Q. 50 are based on Case Study – 2
Case Study - 2

Applications of Parabolas: Highway Overpasses Underpasses - A highway underpass is parabolic in shape. Shape of Cross Slope:

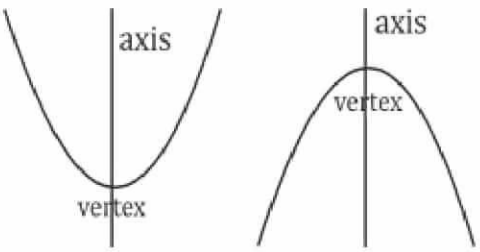


Parabolic camber
equation $y = 2x^2/nw$

Parabola: A parabola is the graph that results from

$$p(x) = ax^2 + bx + c$$

Parabolas are symmetric about a vertical line known as the Axis of Symmetry. The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the vertex.



46. If the highway overpass is represented by $x^2 - 2x - 8$.
(A) (2, –4)
(B) (4, –2)
(C) (–2, –2)
(D) (–4, –4)

47. The highway overpass is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial:
(A) Intersects X-axis
(B) Intersects Y-axis
(C) Intersects Y-axis or X-axis
(D) None of the above.

48. Graph of a quadratic polynomial is a
(A) Straight line
(B) Circle
(C) Parabola
(D) Ellipse

49. The representation of Highway Underpass whose one zero is 6 and sum of the zeroes is 0, is
(A) $x^2 - 6x + 2$
(B) $x^2 - 36$
(C) $x^2 - 6$
(D) $x^2 - 3$

50. The number of zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can have is
(A) 1
(B) 2
(C) 0
(D) 3