Sample/Pre-Board Paper 31

Class X Term 1 Exam Nov -Dec 2021

Mathematics (Standard) 041

Time Allowed: 90 minutes Maximum Marks: 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 LCM of smallest two digit composite number and smallest composite number is

(a) 12 (b) 4

(c) 20 (d) 44

2. If -1 is a zero of the polynomial $p(x) = kx^2 - 4x + k$, the value of k is

(a) –4

(b) –2

(c) 2

(d) 4

3. In a right angled ΔABC right angled at B, if P and Q are points on the sides AB and BC respectively, then

(a) $AQ^2 + CP^2 = 2(AC^2 + PQ^2)$

(b) $2(AQ^2 + CP^2) = AC^2 + PQ^2$

(c) $AQ^2 + CP^2 = AC^2 + PQ^2$

(d) $AQ + CP = \frac{1}{2}(AC + PQ)$

4. ΔABC is an equilateral triangle of side $2a$, then length of one of its altitude is ..... .

(a) $a\sqrt{3}$

(b) $a2\sqrt{3}$

(c) $a3\sqrt{2}$

(d) $a\sqrt{2}$

5. An event is very unlikely to happen. Its probability is closest to

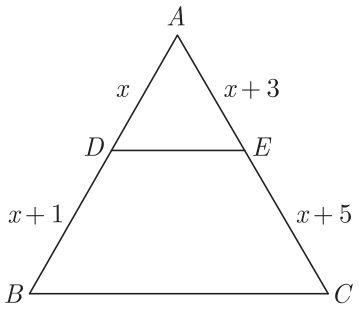
(a) 0.0001

(b) 0.001

(c) 0.01

(d) 0.1

6. In $\Delta ABC, DE \| BC$, the value of x will be



(a) 1 (b) 2

(c) 3 (d) 4

7. 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

8. If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is

(a) an even number (b) an odd number

(c) an odd prime number (d) a prime number

9. In a number of two digits, unit's digit is twice the tens digit. If 36 be added to the number, the digits are reversed. The number is

(a) 36 (b) 63

(c) 48 (d) 84

10. If the point $P(k, 0)$ divides the line segment joining the points $A(2, -2)$ and $B(-7, 4)$ in the ratio $1 : 2$, then the value of k is

(a) 1 (b) 2

(c) -2 (d) -1

11. The decimal representation of $\frac{21}{16 \times 15}$ will

(a) terminate after 2 decimal place

(b) terminate after 3 decimal place

(c) terminate after 4 decimal places

(d) terminate after 5 decimal places

12. What is the smallest natural number by which 1200 should be multiplied so that the square root of the product is a rational number?

(a) 1 (b) 2

(c) 3 (d) 4

13. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, then $m^2 - n^2$ is equal to

(a) $\sqrt{mn}$ (b) $\sqrt{\frac{m}{n}}$

(c) $4\sqrt{mn}$ (d) None of these

14. If $\sin\theta + \sin^2\theta = 1$ then $\cos^2\theta + \cos^4\theta = ?$

(a) 1 (b) 2

(c) $2\sqrt{2}$ (d) $2\sqrt{3}$

15. What is the perimeter of a sector of a circle whose central angle is 90° and radius is 7 cm?

(a) 50π cm (b) 25π cm

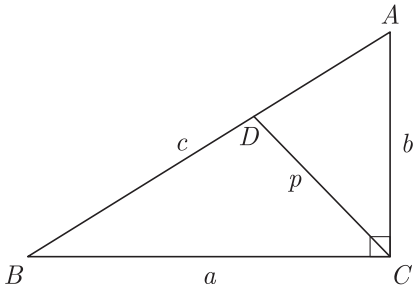
(c) 50 cm (d) 25 cm

16. In an equilateral triangle of side $3\sqrt{3}$ cm the length of the altitude will be

(a) 6.5 cm (b) 5.5 cm

(c) 4.5 cm (d) 7.5 cm

17. Triangle ABC is right angled at C. Let $BC = a$, $CA = b, AB = c$ $PQR, ST \,||\, QR$ and p be the length of perpendicular from C to AB. The cp is equal to



(a) ab (b) $\sqrt{ab}$

(c) $\frac{a+b}{2}$ (d) $2ab$

18. If $5\tan\theta = 3$, then what is the value of $\left(\frac{5\sin\theta - 3\cos\theta}{4\sin\theta + 3\cos\theta}\right)$?

(a) 1 (b) 0

(c) 3 (d) 4

19. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then the value of k is

(a) $-\frac{5}{4}$ (b) $\frac{2}{5}$

(c) $\frac{15}{4}$ (d) $\frac{3}{2}$

20. Out of one digit prime numbers, one number is selected at random. The probability of selecting an even number is

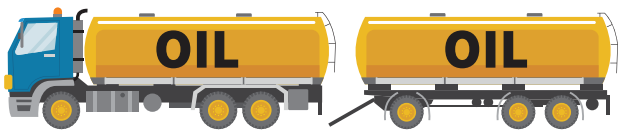
(a) $\frac{1}{3}$ (b) $\frac{1}{4}$

(c) $\frac{3}{4}$ (d) $\frac{2}{3}$

SECTION B

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

21. Two oil tankers contain 825 litres and 675 litres of kerosene oil respectively.



What is the maximum capacity of a container which can measure the kerosene oil of both the tankers when used an exact number of times?

(a) 50 litre

(b) 75 litre

(c) 150 litre

(d) 225 litre

22. If the distance between the points $A(4, p)$ and $B(1, 0)$ is 5 units then the value(s) of p is(are)

(a) 4 only

(b) -4 only

(c) ± 4

(d) 0

23. If $\sin A = \frac{\sqrt{3}}{2}$, the value of $2\cot^2 A - 1$ will be

(a) $\frac{1}{3}$

(b) $-\frac{1}{3}$

(c) $\frac{1}{2}$

(d) $-\frac{1}{2}$

24. Two lines are given to be parallel. The equation of one of the lines is $4x+3y=14$, then the equation of the second line will be

(a) $12x+9x=42$ (b) $12x+9y=5$

(c) $12x+8y=15$ (d) $12x+8y=42$

25. The quadratic polynomial, the sum of whose zeroes is -5 and their product is 6, is

(a) x^2+5x+6 (b) x^2-5x+6

(c) x^2-5x-6 (d) $-x^2+5x+6$

26. A letter is chosen at random from the letters of the word ASSASSINATION, then the probability that the letter chosen is a vowel is in the form of $\frac{6}{2x+1}$, then x is equal to

(a) 5 (b) 6

(c) 7 (d) 8

27. A die is thrown once. What is the probability of getting a number less than 3?

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$

(c) $\frac{1}{2}$ (d) $\frac{1}{5}$

28. $(\operatorname{cosec}\theta-\sin\theta)(\sec\theta-\cos\theta)(\tan\theta+\cot\theta)=?$

(a) $2\sqrt{2}$ (b) 0

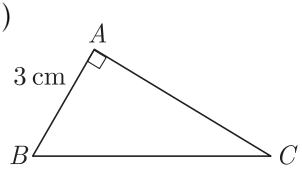
(c) 1 (d) $\sqrt{2}$

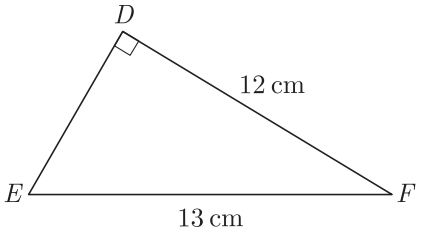
29. The distance of the point $P(-6,8)$ from the origin is

(a) 8 (b) $2\sqrt{7}$

(c) 10 (d) 6

30. Given $\Delta ABC \sim \Delta DEF$, what is the ratio of $\frac{\text{ar}(\Delta ABC)}{\text{ar}(\Delta DEF)}$





(a) 3 : 4 (b) 9 : 25

(c) 9 : 16 (d) 1 : 16

31. If $P(2,-1)$, $Q(3,4)$, $R(-2,3)$ and $S(-3,-2)$ be four points in a plane, then $PQRS$ is a ____

(a) rhombus (b) square

(c) parallelogram (d) rectangle

32. $2+\dfrac{\sin\theta}{\cot\theta-\operatorname{cosec}\theta}=?$

(a) $1-\cos\theta$ (b) $1+\cos\theta$

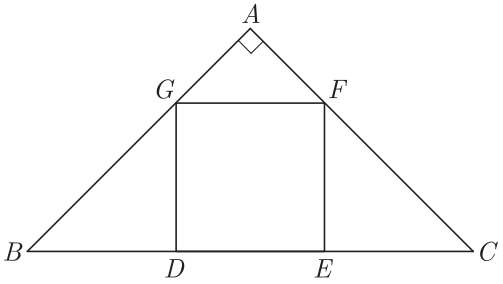
(c) $1+\sin\theta$ (d) $1-\sin\theta$

33. At a train station, the blue line has a train leaving every 15 minutes, the green line has a train leaving every 24 minutes, and the red line every 10 minutes. If the first train on each line leaves at the same time, how often will there be trains on all three lines departing the train station at the same time?

(a) 60 minute (b) 90 minute

(c) 120 minute (d) 150 minute

34. In Figure $DEFG$ is a square in a triangle ABC right angled at A.
Which of the following statement is/are correct?
(i) $\Delta AGF \sim \Delta DBG$
(ii) $\Delta AGF \sim \Delta EFC$



(a) Only (i) is correct

(b) Only (ii) is correct

(c) Both (i) and (ii) are correct.

(d) Both are wrong.

35. If the mid-point of the line segment joining the points $A(3,4)$ and $B(k,6)$ is $P(x,y)$ and $x+y-10=0$, the value of k will be

(a) 4 (b) 5

(c) 6 (d) 7

36. The circumference of a circle exceeds the diameter by 16.8 cm. What is the radius of the circle? Use $\pi=\frac{22}{7}$.

(a) 6.4 cm (b) 3.92 cm

(c) 9.32 cm (d) 7.31 cm

37. A park is of the shape of a circle of diameter 7 m. It is surrounded by a path of width of 0.7 m. If its cost is Rs.110 per sq. m. what is the expenditure of cementing the path?

(a) ₹ 1863 (b) ₹ 3614

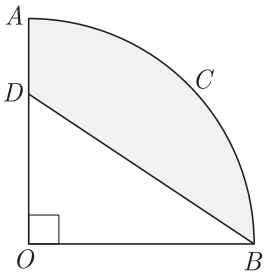
(c) ₹ 1261 (d) ₹ 2148

38. If one root of the equation $(k-1)x^2-10x+3=0$ is the reciprocal of the other then the value of k is .....

(a) 2 (b) 3

(c) 4 (d) 5

39. In the given figure $DACB$ is a quadrant of a circle with centre O and radius 3.5 cm. If $OD=2$, the area of the shaded region will be



(a) 12.125 cm (b) 6.125 cm

(c) 8.5 cm (d) 10.25 cm

40. What are the values of x and y for the following pair of linear equations ?

$$3x+2y-7=0$$
$$4x+y-6=0$$

(a) 1 and 2 (b) 2 and 2

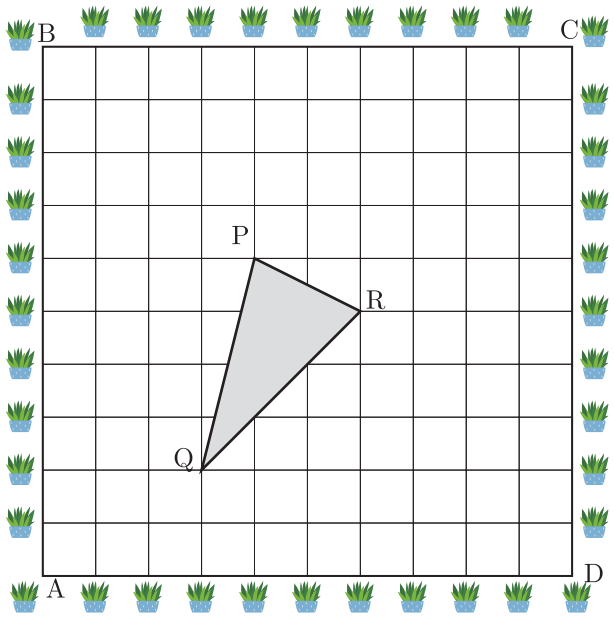
(c) 1 and 1 (d) –1 and –1

SECTION C

Case study based questions:
Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

Case Based Questions: (41-45)

A garden is in the shape of rectangle. Gardener grew sapling of Ashoka tree on the boundary of garden at the distance of 1 meter from each other. He want to decorate the garden with rose plants. He choose triangular region inside the park to grow rose plants. On the above situation, gardener took help from the students of class 10th. They made a chart for it which looks as the above figure.



41. If A is taken as origin, what are the coordinates of triangle PQR ?

(a) $P(4,6), Q(3,2), R(6,5)$

(b) $P(6,4), Q(2,3), R(5,6)$

(c) $P(5,7), Q(3,3), R(5,5)$

(d) $P(6,6), Q(2,3), R(6,6)$

42. If C is taken as origin, what is the co-ordinate of point P ?

(a) $(-12,2)$ (b) $(12,2)$

(c) $(6,-4)$ (d) $(-6,-4)$

43. If B is taken as origin, what are the co-ordinate of P ?

(a) $(4,4)$ (b) $(-4,4)$

(c) $(4,-4)$ (d) $(-4,-4)$

44. What is distance between P and Q if origin is taken A?

(a) $\sqrt{71}$ (b) $\sqrt{17}$

(c) $\sqrt{65}$ (d) $\sqrt{50}$

45. What is distance between P and Q if origin is taken B?

(a) $\sqrt{50}$ (b) $\sqrt{71}$

(c) $\sqrt{17}$ (d) $\sqrt{61}$

Case Based Questions: (46-50)

The Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund was created on 28 March 2020, following the COVID-19 pandemic in India. The fund will be used for combating, and containment and relief efforts against the coronavirus outbreak and similar pandemic like situations in the future.

The allotment officer is trying to come up with a method to calculate fair division of funds across various affected families so that the fund amount and amount received per family can be easily adjusted based on daily revised numbers. The total fund allotted for a village is $x^3+6x^2+20x+9$. The officer has divided the fund equally among families of the village and each family receives an amount of x^2+2x+2. After distribution, some amount is left.

46. How many families are there in the village?

(a) $x+4$ (b) $x-3$

(c) $x-4$ (d) $x+3$

47. If an amount of ₹1911 is left after distribution, what is value of x?

(a) 190 (b) 290

(c) 191 (d) 291

48. How much amount does each family receive?

(a) 24490 (b) 34860

(c) 22540 (d) 36865

49. What is the amount of fund allocated?

(a) ₹ 72 72 759 (b) ₹ 75 72 681

(c) ₹ 69 72 846 (d) ₹ 82 74 888

50. How many families are there in the village?

(a) 191 (b) 98

(c) 187 (d) 195

SAMPLE PAPER - 26 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(c)	Ch-1	5
2	(c)	Ch-2	S-6
3	(c)	Ch-4	6
4	(a)	Ch-4	19
5	(a)	Ch-8	5
6	(c)	Ch-4	29
7	(a)	Ch-6	5
8	(a)	Ch-1	17
9	(c)	Ch-3	5
10	(d)	Ch-5	5
11	(c)	Ch-1	32
12	(c)	Ch-1	S-21
13	(c)	Ch-6	19
14	(a)	Ch-6	34
15	(d)	Ch-7	37
16	(c)	Ch-4	39
17	(a)	Ch-4	50
18	(b)	Ch-6	52
19	(c)	Ch-3	16
20	(b)	Ch-8	17
21	(b)	Ch-1	D-46
22	(c)	Ch-5	15
23	(b)	Ch-6	64
24	(b)	Ch-3	28
25	(a)	Ch-2	5

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(b)	Ch-8	27
27	(a)	Ch-8	37
28	(c)	Ch-6	78
29	(c)	Ch-5	26
30	(b)	Ch-4	61
31	(a)	Ch-5	51
32	(a)	Ch-6	94
33	(c)	Ch-1	59
34	(c)	Ch-4	72
35	(d)	Ch-5	40
36	(b)	Ch-7	59
37	(a)	Ch-7	88
38	(c)	Ch-2	28
39	(b)	Ch-7	98
40	(a)	Ch-3	38
41	(a)	Ch-5	132
42	(d)	Ch-5	133
43	(d)	Ch-5	134
44	(b)	Ch-5	135
45	(c)	Ch-5	136
46	(a)	Ch-2	84
47	(c)	Ch-2	85
48	(d)	Ch-2	86
49	(c)	Ch-2	87
50	(d)	Ch-2	88

*** S- = Self Test Question, * D- = Direction Based Question**