Sample/Pre-Board Paper 16

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 the equations $kx-2y=3$ and $3x+y=5$ represent two intersecting lines at unique point, then the value of k is ..... .

(a) $k=-6$ (b) $k\neq -6$

(c) $k=4$ (d) $k\neq 4$

3. It is given that $\Delta ABC \sim \Delta PQR$ with $\frac{BC}{QR}=\frac{1}{4}$. Then $\frac{\text{ar}(\Delta PRQ)}{\text{ar}(\Delta BCA)}$ is equal to

(a) 16 (b) 3

(c) $\frac{1}{4}$ (d) $\frac{1}{16}$

4. The sides AB and AC and the perimeter P_1 of ΔABC are respectively three times the corresponding sides DE and DF and the parameter P_2 of ΔDEF. What is the value of $\frac{\text{ar}(\Delta ABC)}{\text{ar}(\Delta DEF)}$?

(a) 4 (b) 8

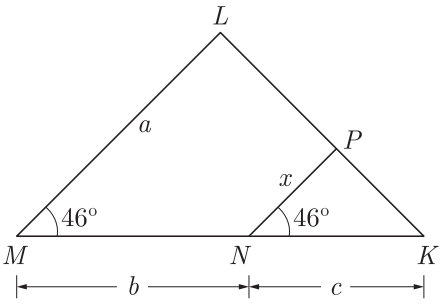
(c) 9 (d) 16

5. If an event cannot occur, then its probability is

(a) 1 (b) $\frac{2}{3}$

(c) $\frac{3}{4}$ (d) 0

6. In the given figure, x is



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

(c) $\frac{bc}{b+c}$ (d) $\frac{ac}{a+c}$

7. If ΔABC is right angled at C, then the value of $\cos(A+B)$ is

(a) 0 (b) 1

(c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

8. $2.\overline{35}$ is

(a) an integer (b) a rational number

(c) an irrational number (d) a natural number

9. The pair of equations $y=0$ and $y=-7$ has

(a) one solution

(b) two solutions

(c) infinitely many solutions

(d) no solution

10. The coordinates of a point A on y-axis, at a distance of 4 units from x-axis and below it are

(a) (4, 0) (b) (0, 4)

(c) $(-4,0)$ (d) (0, -4)

11. The sum and product of zeroes of a quadratic polynomial are 6 and 9 respectively. The quadratic polynomial will be

(a) x^2+9x-6 (b) x^2+6x+9

(c) x^2-6x+9 (d) x^2+6x-9

12. The HCF and the LCM of 12, 21, 15 are respectively

(a) 3, 140 (b) 12, 420

(c) 3, 420 (d) 420, 3

13. $(\cos^4 A - \sin^4 A)$ is equal to

(a) $1-2\cos^2 A$ (b) $2\sin^2 A-1$

(c) $\sin^2 A-\cos^2 A$ (d) $2\cos^2 A-1$

14. If $\sin A = \frac{3}{4}$ then $\sec A$ is equal to

(a) $\frac{4}{\sqrt{5}}$ (b) $\frac{4}{\sqrt{7}}$

(c) $\frac{\sqrt{5}}{4}$ (d) $\frac{\sqrt{7}}{4}$

15. The area of a circular ring formed by two concentric circles whose radii are 5.7 cm and 4.3 cm respectively is (Take $\pi = 3.1416$)

(a) 44 sq. cm. (b) 66 sq. cm.

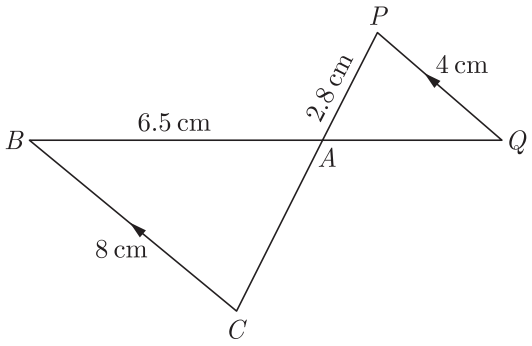
(c) 22 sq. cm. (d) 33 sq. cm.

16. It is given that, $\Delta ABC \sim \Delta EDF$ such that $AB = 5$ cm, $AC = 7$ cm, $DF = 15$ cm and $DE = 12$ cm then the sum of the remaining sides of the triangles is

(a) 23.05 cm (b) 16.8 cm

(c) 6.25 cm (d) 24 cm

17. In the given figure, $BC \| PQ$ and $BC = 8$ cm, $PQ = 4$ cm, $BA = 6.5$ cm $AP = 2.8$ cm.
The length of CA is



(a) 2.80 cm (b) 5.60 cm

(c) 3.25 cm (d) 2.10 cm

18. If $4\sin\theta = 3$, then $\tan\theta$ is equal to

(a) $\frac{3}{\sqrt{7}}$ (b) $\frac{2}{\sqrt{7}}$

(c) $\frac{\sqrt{7}}{4}$ (d) $\frac{\sqrt{7}}{2}$

19. One equation of a pair of dependent linear equations $-5x+7y=2$ The second equation can be

(a) $10x+14y+4=0$ (b) $-10x-14y+4=0$

(c) $-10x+14y+4=0$ (d) $10x-14y=-4$

20. If the probability of wining a game is 0.07, what is the probability of losing it?

(a) 0.14 (b) 0.93

(c) 0.46 (d) 0.57

SECTION B

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

21. a and b are two positive integers such that the least prime factor of a is 3 and the least prime factor of b is 5. Then the least prime factor of $(a+b)$ will be

(a) 1 (b) 2

(c) 3 (d) 4

22. 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

23. 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

24. The ages of two friends Ani and Biju differ by 3 years. Ani's father Dharam is twice as old as ani and Biju is twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 year. Find the ages of Ani and Biju.
The age of Ani is

(a) 16 year

(b) 19 year

(c) 20 years

(d) 24 years

25. A teacher asked 10 of his students to write a polynomial in one variable on a paper and then to handover the paper. The following were the answers given by the students :
$2x+3$, $3x^2+7x+2$, $4x^3+3x^2+2$, $x^3+\sqrt{3x}+7$, $7x+\sqrt{7}$, $5x^3-7x+2$, $2x^2+3-\frac{5}{x}$, $5x-\frac{1}{2}$, ax^3+bx^2+cx+d, $x+\frac{1}{x}$.
How many of the above ten, are not polynomials?

(a) 2 (b) 3
(c) 4 (d) 5

26. Two different dice are thrown together. What is the probability that the numbers obtained have even product.

(a) 0.50 (b) 0.30
(c) 0.65 (d) 0.75

27. Two dice are thrown at the same time. What is the probability of getting sum of two numbers appearing on both the dice is 8 ?

(a) $\frac{1}{6}$ (b) $\frac{1}{12}$
(c) $\frac{1}{18}$ (d) $\frac{5}{36}$

28. $(\sin A+\sec A)^2+(\cos A+\operatorname{cosec} A)^2=$?

(a) $(1+\sec A\operatorname{cosec} A)^2$
(b) $(1+\cos A\sin A)^2$
(c) $(1+\cos A\operatorname{cosec} A)^2$
(d) $(1+\sin A\sec A)^2$

29. What is the coordinates of a point P on x-axis which is equidistant from the points $A(-2,0)$ and $B(6,0)$.

(a) (1, 0) (b) (2, 0)
(c) (3, 0) (d) (4, 0)

30. If ΔABC is an obtuse angled triangle, obtuse angled at B and if $AD \perp CB$. Term AC^2 is equal to

(a) $2AB^2+2BC^2+BC\times BD$
(b) $AB^2+BC^2+2BC\times BD$
(c) $AB^2+BC^2+BC\times BD$
(d) $AB^2+BC^2+\frac{1}{2}BC\times BD$

31. What is the ratio in which $P(4,m)$ divides the segment joining the points $A(2,3)$ and $B(6,-3)$.

(a) 1 : 3 (b) 1 : 2
(c) 1 : 1 (d) 1 : 4

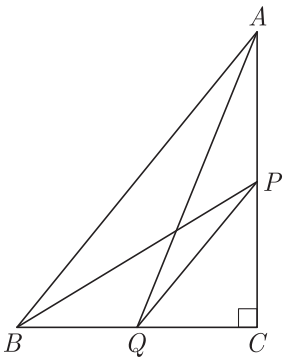
32. $\dfrac{\operatorname{cosec}^2\theta}{\operatorname{cosec}\theta-1}-\dfrac{\operatorname{cosec}^2\theta}{\operatorname{cosec}\theta+1}=$?

(a) $2\sin^2\theta$
(b) $2\sec^2\theta$
(c) $2\cos^2\theta$
(d) $2\operatorname{cosec}^2\theta$

33. In a morning walk, three persons step off together. Their steps measure 75 cm, 80 cm and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps?

(a) 38 m (b) 30 m
(c) 32 m (d) 36 m

34. If P and Q are the points on side CA and CB respectively of ΔABC, right angled at C, then that $(AQ^2+BP^2)=(AB^2+PQ^2)$ is equal to



(a) $2(AB^2+PQ^2)$ (b) $(2AB^2+PQ^2)$
(c) (AB^2+2PQ^2) (d) (AB^2+PQ^2)

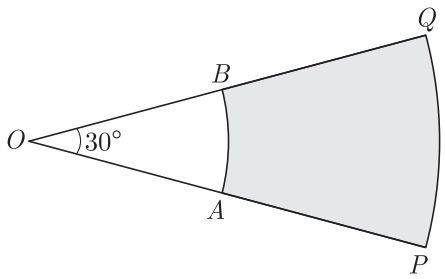
35. If $A(-1,0)$, $B(3,1)$, $C(2,2)$ and $D(-2,1)$ to be four point in plane then $ABCD$ is a _____

(a) rhombus
(b) square
(c) parallelogram
(d) rectangle

36. The areas of two circles are in the ratio 9 : 4, then what is the ratio of their circumferences?

(a) 4 : 9
(b) 2 : 3
(c) 3 : 2
(d) 9 : 4

37. In given figure, PQ and AB are two arcs of concentric circles of radii 7 cm and 3.5 cm respectively, with centre O. If $\angle POQ = 30^\circ$, what is the area of shaded region?



(a) $9.625\,\text{cm}^2$ (b) $18.5\,\text{cm}^2$

(c) $12.625\,\text{cm}^2$ (d) $14.5\,\text{cm}^2$

38. Select the quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial $f(x) = ax^2 + bx + c$, $a \neq 0$, $c \neq 0$.

(a) $bx^2 + ax + c$ (b) $ax^2 + cx + b$

(c) $cx^2 + bx + a$ (d) $bx^2 + cx + a$

39. A chord of a circle of radius 10 cm subtends a right angle at the centre. What is area of minor segment. $(\pi = 3.14)$

(a) $10\pi\,\text{cm}^2$ (b) $20\pi\,\text{cm}^2$

(c) $28.5\,\text{cm}^2$ (d) $57.5\,\text{cm}^2$

40. The population of a village is 5000. If in a year, the number of males were to increase by 5% and that of a female by 3% annually, the population would grow to 5202 at the end of the year. Find the number of males and females in the village.
The number of male in village is

(a) 2600 (b) 2400

(c) 2200 (d) 2800

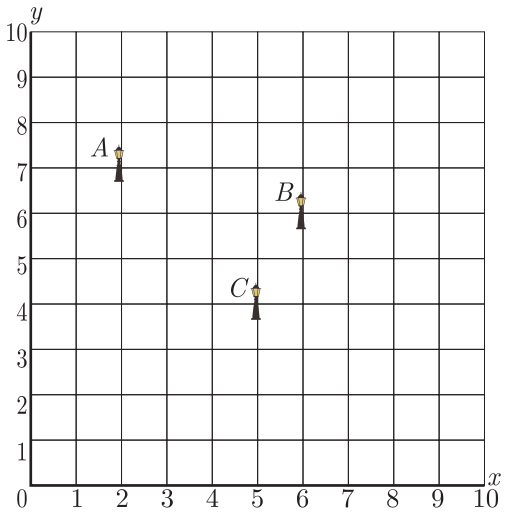
SECTION C

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)

Resident Welfare Association (RWA) of a Gulmohar Society in Delhi have installed three electric poles A, B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decides to have one more electric pole D in the park.

The park can be modelled as a coordinate systems given below.



On the basis of the above information, answer any four of the following questions:

41. What is the position of the pole C?

(a) (4 ,5) (b) (5, 4)

(c) (6, 5) (d) (5, 6)

42. What is the distance of the pole B from the corner O of the park ?

(a) $6\sqrt{2}$ units

(b) $3\sqrt{2}$ units

(c) $6\sqrt{3}$ units

(d) $3\sqrt{3}$ units

43. Find the position of the fourth pole D so that four points A, B C and D form a parallelogram .

(a) (5, 2) (b) (1, 5)

(c) (1, 4) (d) (2, 5)

44. What is the distance between poles A and C ?

(a) $6\sqrt{2}$ units (b) $3\sqrt{2}$ units

(c) $6\sqrt{3}$ units (d) $3\sqrt{3}$ units

45. What is the distance between poles B and D?

(a) $2\sqrt{3}$ units (b) $\sqrt{28}$ units

(c) $6\sqrt{3}$ units (d) $\sqrt{26}$ units

Case Based Questions: (46-50)

Underground water tank is very popular in India. It is usually used for large water tank storage and can be built cheaply using cement-like materials. Underground water tank are typically chosen by people who want to save space. The water in the underground water tank is not affected by extreme weather conditions. The underground water tank maintain cool temperatures in both winter and summer.

A builder wants to build a tank to store water in an apartment. The volume of the rectangular tank will be modelled by $V(x) = x^3 + x^2 - 4x - 4$.

46. He planned in such a way that its base dimensions are $(x+1)$ and $(x+2)$. How much he has to dig ?

(a) $(x+1)$ (b) $(x-2)$

(c) $(x-3)$ (d) $(x+2)$

47. If $x = 4$ meter, what is the volume of the water tank?

(a) 30 m^3 (b) 20 m^3

(c) 15 m^3 (d) 60 m^3

48. If $x = 4$ and the builder wants to paint the entire inner portion on the water tank, what is the total area to be painted ?

(a) 52 m^2 (b) 96 m^2

(c) 208 m^2 (d) 104 m^2

49. If the cost of paint is ₹ 25/ per square metre, what is the cost of painting ?

(a) ₹ 3900 (b) ₹ 2600

(c) ₹ 1300 (d) ₹ 5200

50. What is the storage capacity of this water tank ?

(a) 3000 litre (b) 6000 litre

(c) 60000 litre (d) 30000 litre

SAMPLE PAPER - 11 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(c)	Ch-1	5
2	(b)	Ch-3	24
3	(a)	Ch-4	S-120
4	(c)	Ch-4	S-153
5	(d)	Ch-8	3
6	(b)	Ch-4	2
7	(a)	Ch-6	5
8	(b)	Ch-1	11
9	(d)	Ch-3	13
10	(d)	Ch-5	6
11	(c)	Ch-2	S-2
12	(c)	Ch-1	3
13	(d)	Ch-6	16
14	(b)	Ch-6	91
15	(a)	Ch-7	1
16	(a)	Ch-4	7
17	(b)	Ch-4	D-67
18	(a)	Ch-6	121
19	(d)	Ch-3	18
20	(b)	Ch-8	S-1
21	(b)	Ch-1	29
22	(d)	Ch-5	40
23	(c)	Ch-6	19
24	(b)	Ch-3	D-86
25	(a)	Ch-2	D-43

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(d)	Ch-8	165
27	(d)	Ch-8	130
28	(a)	Ch-6	119
29	(b)	Ch-5	S-1
30	(b)	Ch-4	S-139
31	(c)	Ch-5	S-20
32	(b)	Ch-6	80
33	(d)	Ch-1	57
34	(d)	Ch-4	S-129
35	(c)	Ch-5	72
36	(c)	Ch-7	S-1
37	(a)	Ch-7	S-11
38	(c)	Ch-2	41
39	(c)	Ch-7	S-21
40	(a)	Ch-3	D-102
41	(b)	Ch-5	112
42	(a)	Ch-5	113
43	(b)	Ch-5	114
44	(b)	Ch-5	115
45	(d)	Ch-5	116
46	(b)	Ch-2	104
47	(d)	Ch-2	105
48	(d)	Ch-2	106
49	(b)	Ch-2	107
50	(c)	Ch-2	108

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