Sample/Pre-Board Paper 30

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. HCF of two numbers is 27 and their LCM is 162. If one of the numbers is 54, then the other number is

(a) 36 (b) 35

(c) 9 (d) 81

2. If m and n are the zeroes of the polynomial $3x^2 + 11x - 4$, then value of $\frac{m}{n} + \frac{n}{m}$ will be

(a) $\frac{12}{145}$ (b) $-\frac{12}{145}$

(c) $-\frac{145}{12}$ (d) $\frac{145}{12}$

3. 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

4. ΔABC and ΔBDE are two equilateral triangle such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is ..... .

(a) 1 : 1 (b) 3 : 1

(c) 2 : 1 (d) 4 : 1

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

(a) $p - 1$ (b) p

(c) $1 - p$ (d) $1 - \frac{1}{p}$

6. ΔABC is isosceles with $AC = BC$. If $AB^2 = 2AC^2$, then the measure of $\angle C$ will be

(a) 30°

(b) 60°

(c) 45°

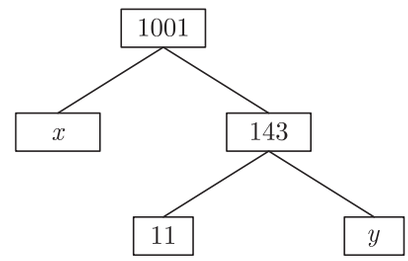
(d) 90°

7. If $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to

(a) $\frac{b}{\sqrt{b^2 - a^2}}$ (b) $\frac{\sqrt{b^2 - a^2}}{a}$

(c) $\frac{\sqrt{b^2 - a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2 - a^2}}$

8. The values of x and y in the given figure are



(a) 7, 13 (b) 13, 7

(c) 9, 12 (d) 12, 9

9. A fraction becomes 4 when 1 is added to both the numerator and denominator and it becomes 7 when 1 is subtracted from both the numerator and denominator. The numerator of the given fraction is

(a) 2 (b) 3

(c) 5 (d) 15

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 number $\frac{7}{75}$ will have -

(a) non-terminating repeating decimal expansion.

(b) terminating decimal expansion.

(c) non-terminating non repeating decimal expansion.

(d) terminating non repeating decimal expansion

12. Select the smallest positive rational number by which $\frac{1}{7}$ should be multiplied so that its decimal expansion terminates after 2 places of decimal.

(a) $\frac{1}{100}$ (b) $\frac{7}{100}$

(c) $\frac{7}{10}$ (d) $\frac{1}{10}$

13. If $\sin\theta = \frac{5}{13}$, then the value of $\tan\theta$ is ..... .

(a) $\frac{5}{13}$ (b) $\frac{5}{12}$

(c) $\frac{12}{13}$ (d) $\frac{8}{13}$

14. If $\sec\theta \cdot \sin\theta = 0$, then value of θ will be

(a) 0 (b) 90°

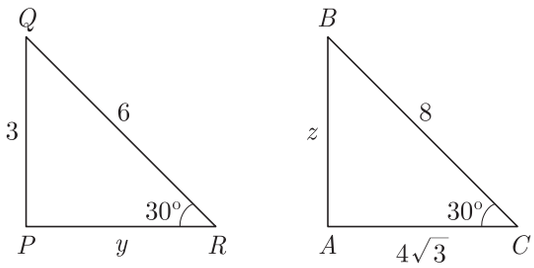
(c) 45° (d) ∞

15. What is the area of circle that can be inscribed in a square of side 10 cm?

(a) 25π cm^2 (b) 50π cm^2

(c) 25 cm^2 (d) 50 cm^2

16. In the given figure, $\Delta ABC \sim \Delta PQR$. The value of $y+z$ will be



(a) $2\sqrt{2}+3$ (b) $3\sqrt{3}+4$

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

17. $ABCD$ is a trapezium in which $AB \| CD$ and its diagonals intersect each other at the point O. Which of the following is correct relation ?

(a) $\frac{AO}{BO} = \frac{2DO}{CO}$ (b) $\frac{AO}{BO} = \frac{DO}{CO}$

(c) $\frac{AO}{BO} = \frac{CO}{DO}$ (d) $\frac{AO}{BO} = \frac{2CO}{DO}$

18. $\frac{3\tan^2 30^\circ + \tan^2 60^\circ + \text{cosec}\,30^\circ - \tan 45^\circ}{\cot^2 45^\circ} = ?$

(a) 2 (b) 3

(c) 4 (d) 5

19. The value of c for which the pair of equations $cx - y = 2$ and $6x - 2y = 3$ will have is

(a) 3 (b) -3

(c) -12 (d) no value

20. A bag contains 3 red and 2 blue marbles. If a marble is drawn at random, then the probability of drawing a blue marble is

(a) $\frac{2}{5}$ (b) $\frac{1}{4}$

(c) $\frac{3}{5}$ (d) $\frac{2}{3}$

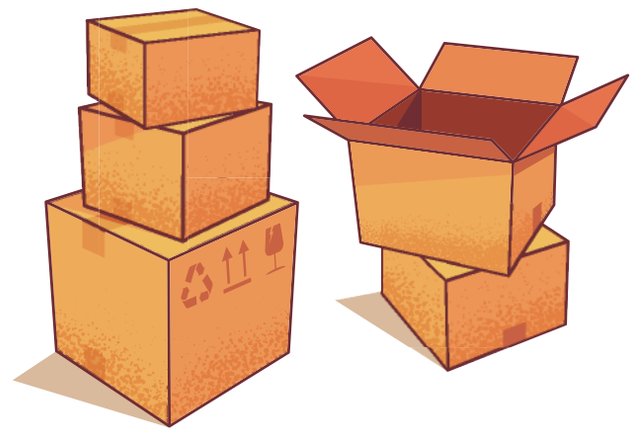
SECTION B

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

21. An online shopping website sells 10 types of items which are packed into various sizes of cartons which are given below.

Carton type	Inner Dimensions (L × W)cm^2
Small	6 × 8
Medium	12 × 24
Large	24 × 36
Extra large	36 × 48
XXL	48 × 96

The company places supporting thermocol sheets inside every package along the edges. The company thought of procuring same sized sheets for all types of cartons.



What should be the maximum size of the sheet that fits into all type of cartons?

(a) 6 by 4 (b) 6 by 2

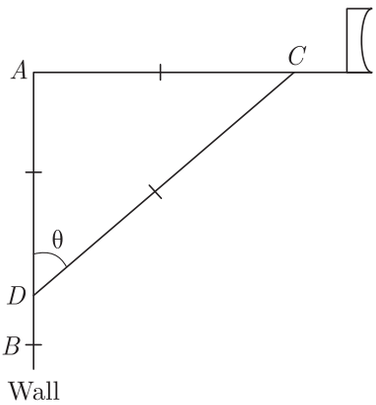
(c) 4 by 2 (d) 4 by 4

22. If the points $A(4,3)$ and $B(x,5)$ are on the circle with centre $O(2,3)$, then the value of x is

(a) 0 (b) 1

(c) 2 (d) 3

23. The rod of TV disc antenna is fixed at right angles to wall AB and a rod CD is supporting the disc as shown in Figure. If $AC = 3\,\text{m}$ long and $CD = 5\,\text{m}$, the value of $\tan\theta$ will be



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

(c) $\frac{4}{5}$ (d) $\frac{3}{5}$

24. Which of the following value of k should be selected so that the pair of equations $x+2y=5$ and $3x+ky+15=0$ has a unique solution ?

(a) $k \neq 5$ (b) $k \neq 6$

(c) $k=5$ (d) $k=6$

25. If one zero of the polynomial $(3x^2+8x+k)$ is the reciprocal of the other, then value of k is

(a) 3 (b) -3

(c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

26. Ramesh buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random a tank containing 5 male fish and 9 female fish. Then, the probability that the fish taken out is a male fish, is

(a) $\frac{5}{13}$ (b) $\frac{5}{14}$

(c) $\frac{6}{13}$ (d) $\frac{7}{13}$

27. A card is drawn from a well shuffled deck of playing cards. What is the probability of drawing a red face card?

(a) $\frac{1}{26}$ (b) $\frac{3}{26}$

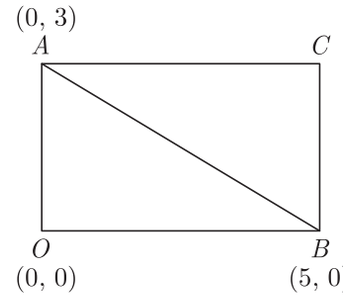
(c) $\frac{5}{26}$ (d) $\frac{7}{26}$

28. $\dfrac{\text{cosec}^2\theta}{\text{cosec}\,\theta-1} - \dfrac{\text{cosec}^2\theta}{\text{cosec}\,\theta+1} = ?$

(a) $2\sin^2\theta$ (b) $2\sec^2\theta$

(c) $2\cos^2\theta$ (d) $2\,\text{cosec}^2\theta$

29. If $AOBC$ is a rectangle whose three vertices are $A(0,3)$, $O(0,0)$ and $B(5,0)$, then the length of its diagonal is



(a) 5 (b) 3

(c) $\sqrt{34}$ (d) 4

30. If in ΔABC, AD is median and $AE \perp BC$, then AB^2+AC^2 equal to

(a) $2AD^2+BC^2$ (b) $\frac{1}{2}AD^2+2BC^2$

(c) AD^2+2BC^2 (d) $2AD^2+\frac{1}{2}BC^2$

31. 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

32. Given that $\sin(A+2B)=\frac{\sqrt{3}}{2}$ and $\cos(A+4B)=0$, where A and B are acute angles. The value of A is

(a) 30° (b) 45°

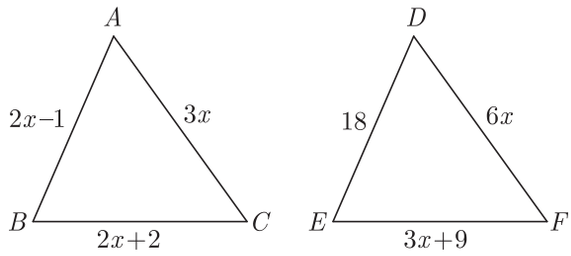
(c) 60° (d) 90°

33. Four satellites revolve around the earth once every 6, 8, 10, and 15 hr, respectively. If the satellites are initially lined up, how many hours must pass before they will again be lined up?

(a) 90 hours (b) 200 hours

(c) 120 hours (d) 180 hours

34. In Figure, if $\Delta ABC \sim \Delta DEF$ and their sides of lengths (in cm) are marked along them, then find the lengths of sides of each triangle.



The length of side AB is

(a) 9 (b) 12

(c) 15 (d) 24

35. If the point $P(x, y)$ is equidistant from the points $Q(a+b, b-a)$ and $R(a-b, a+b)$ then,

(a) $2ay = xy$ (b) $bx = ay$

(c) $ab = xy$ (d) $by = ax$

36. What is the area of the corresponding major sector of a circle of radius 28 cm and the central angle 45°?

(a) 4312 cm^2 (b) 2156 cm^2

(c) 1256 cm^2 (d) 3412 cm^2

37. Two circles touch internally. The sum of their areas is 116π and the difference between their centres is 6 cm. What are the radii of the circles?

(a) 10 cm and 4 cm (b) 6 cm and 8 cm

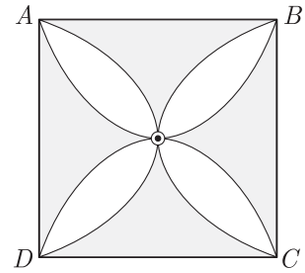
(c) 4 cm and 8 cm (d) 6 cm and 4 cm

38. If α and β are the roots of $ax^2 - bx + c = 0 (a \neq 0)$, then value of $\alpha + \beta$ is

(a) $\frac{b}{a}$ (b) $\frac{a}{b}$

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

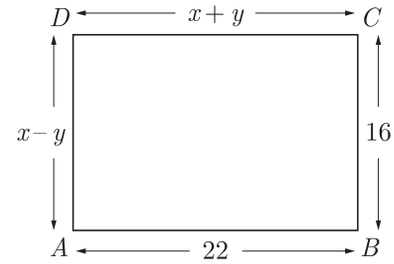
39. In fig. $ABCD$ is a square of side 14 cm. Semi-circle are drawn with each side of square as diameter. What is the area of the shaded region? Use $\pi = \frac{22}{7}$.



(a) 42 cm^2 (b) 84 cm^2

(c) 48 cm^2 (d) 96 cm^2

40. In the figure given below, $ABCD$ is a rectangle. The values of x and y will be



(a) 3 and 19 (b) 19 and 3

(c) 4 and 18 (d) 18 and 4

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)

Satellite Images : Satellite images are images of Earth collected by imaging satellites operated by governments and businesses around the world. Satellite imaging companies sell images by licensing them to governments and businesses such as Apple Maps and Google Maps. It should not be confused for astronomy images collected by space telescope.

Barun lives in Jaipur in Vaishali. Satellite image of his colony is shown in given figure. In this view, his house is pointed out by a flag, which is situated at the point of intersection of x and y- axes. If he goes 2 cm east and 3 cm north from the house, then he reaches to a

grocery store, If he goes 4 cm west and 6 cm south from the house, then he reaches to his office. If he goes 6 cm east and 8 cm south from the house, then he reaches to a food court. If he goes 6 cm west and 8 cm north from the house, he reaches to a his kid's school. Based on the above information, answer the following questions.

41. What is the distance between grocery store and food court?

(a) $\sqrt{137}$ cm (b) $\sqrt{129}$ cm

(c) $8\sqrt{15}$ cm (d) $16\sqrt{3}$ cm

42. What is the distance of the school from the house?

(a) 10 cm (b) 15 cm

(c) 20 cm (d) 25 cm

43. If the grocery store and office lie on a line, what is the ratio of distance of house from grocery store to that from office ?

(a) 2 :1 (b) 3 : 1

(c) 4 : 1 (d) 5 : 1

44. What is the ratio of distances of house from school to food court.

(a) 1 :1 (b) 2 : 1

(c) 3 : 1 (d) 4 : 1

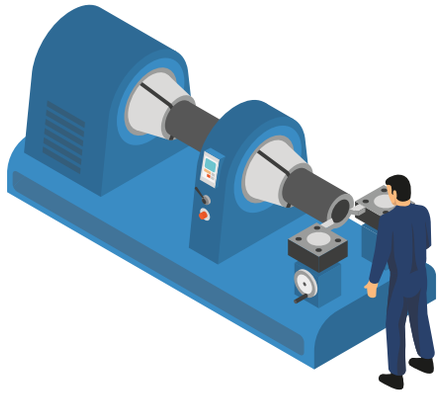
45. What shape is formed by the coordinates of positions of school, grocery store, food court and office?

(a) square (b) rectangle

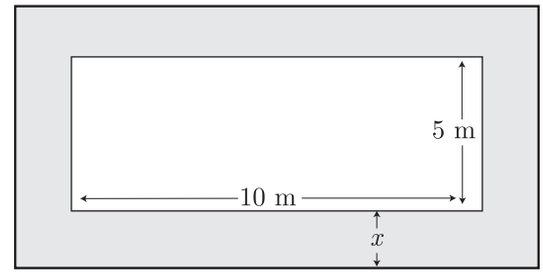
(c) rhombus (d) quadrilateral

Case Based Questions: (46-50)

RK Fabricators has got a order for making a frame for machine of their client. For which, they are using a AutoCAD software to create a constructible model that includes the relevant information such as dimensions of the frame and materials needed.



The frame will have a solid base and will be cut out of a piece of steel. The final area of the frame should be 54 sq m. The digram of frame is shown below.



In order to input the right values in the AutoCAD software, the engineer needs to calculate some basic values.

46. What are the dimensions of the outer frame ?

(a) $(10+x)$ and $(5+x)$

(b) $(10-x)$ and $(5-x)$

(c) $(10+2x)$ and $(5+2x)$

(d) $(10-2x)$ and $(5-2x)$

47. A metal sheet of minimum area is used to make the frame. What should be the minimum area of metal sheet before cutting ?

(a) $4x^2+30x+50$ (b) $x^2+27x+55$

(c) $5x^2+30$ (d) $4x^2+50$

48. What is the area of required final metal frame ?

(a) $4x^2+30x+50\,\text{m}^2$ (b) $x^2+27x+55\,\text{m}^2$

(c) $4x^2+50x\,\text{m}^2$ (d) $4x^2+30x\,\text{m}^2$

49. If the area of the frame is 54 sq m, what is the value of x ?

(a) 0.75 m (b) 3.0 m

(c) 1.5 m (d) 1.8 m

50. What is the perimeter of the frame?

(a) 36 m (b) 42 m

(c) 45 m (d) 39 m

SAMPLE PAPER - 25 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(d)	Ch-1	6
2	(c)	Ch-2	S-5
3	(a)	Ch-4	7
4	(d)	Ch-4	20
5	(c)	Ch-8	6
6	(d)	Ch-4	30
7	(c)	Ch-6	6
8	(a)	Ch-1	16
9	(d)	Ch-3	7
10	(d)	Ch-5	6
11	(a)	Ch-1	31
12	(b)	Ch-1	S-22
13	(b)	Ch-6	24
14	(a)	Ch-6	36
15	(c)	Ch-7	39
16	(b)	Ch-4	40
17	(c)	Ch-4	51
18	(d)	Ch-6	53
19	(d)	Ch-3	17
20	(b)	Ch-8	18
21	(a)	Ch-1	D-42
22	(c)	Ch-5	17
23	(b)	Ch-6	65
24	(b)	Ch-3	29
25	(a)	Ch-2	6

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(b)	Ch-8	28
27	(b)	Ch-8	38
28	(b)	Ch-6	80
29	(c)	Ch-5	27
30	(d)	Ch-4	62
31	(c)	Ch-5	52
32	(a)	Ch-6	95
33	(c)	Ch-1	58
34	(a)	Ch-4	D-73
35	(b)	Ch-5	41
36	(b)	Ch-7	55
37	(a)	Ch-7	87
38	(a)	Ch-2	29
39	(b)	Ch-7	97
40	(b)	Ch-3	39
41	(a)	Ch-5	138
42	(a)	Ch-5	139
43	(a)	Ch-5	140
44	(a)	Ch-5	141
45	(d)	Ch-5	142
46	(c)	Ch-2	79
47	(a)	Ch-2	80
48	(d)	Ch-2	81
49	(c)	Ch-2	82
50	(b)	Ch-2	83

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