Sample/Pre-Board Paper 29

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 144 and 198 is

(a) 9 (b) 18

(c) 6 (d) 12

2. Select the quadratic polynomial $p(x)$ with 3 and $-\frac{2}{5}$ as sum and product of its zeroes, respectively.

(a) $x^2-3x-\frac{2}{5}$ (b) x^2-3x-2

(c) $5x^2-15x-2$ (d) $15x^2-5x+\frac{2}{5}$

3. The area of a right angled triangle is 40 sq cm and its perimeter is 40 cm. The length of its hypotenuse is

(a) 16 cm (b) 18 cm

(c) 17 cm (d) data insufficient

4. A ladder 10 m long reaches a window 8 m above the ground. The distance of the foot of the ladder from the base of the wall is ..... m.

(a) 8 m (b) 2 m

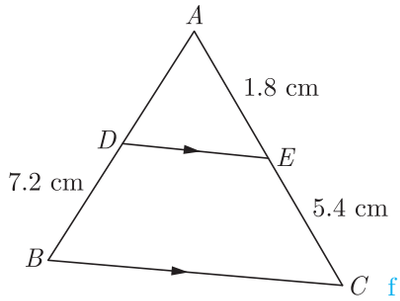
(c) 6 m (d) 4 m

5. The $P(A)$ denotes the probability of an event A, then

(a) $P(A)<0$ (b) $P(A)>1$

(c) $0 \le P(A) \le 1$ (d) $-1 \le P(A) \le 1$

6. In Figure, $DE \| BC$ and given that $AE = 1.8$ cm, $BD = 7.2$ cm and $CE = 5.4$ cm. The length of side AD will be



(a) 1.6 cm (b) 1.9 cm

(c) 2.1 cm (d) 2.4 cm

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

(a) ab (b) a^2b^2

(c) a^3b^2 (d) a^3b^3

9. x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of $x+y$ is

(a) 10 (b) 11

(c) 12 (d) 13

10. The distance of the point $(-12, 5)$ from the origin is

(a) 12 (b) 5

(c) 13 (d) 169

11. Select the least number that is divisible by all numbers between 1 and 10 (both inclusive).

(a) 2520 (b) 5040

(c) 1010 (d) 2020

12. What are the HCF and LCM of 16 and 36?

(a) 4 and 9 (b) 9 and 4

(c) 4 and 144 (d) 144 and 4

13. The value of the $(\tan^2 60^\circ + \sin^2 45^\circ)$ is ..... .

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

(c) 1 (d) $\frac{7}{2}$

14. If $\tan(3x + 30^\circ) = 1$ then the value of x. will be

(a) 5° (b) 10°

(c) 20° (d) 30°

15. What is the diameter of a circle whose area is equal to the sum of the areas of two circles of radii 40 cm and 9 cm?

(a) 82 cm (b) 41 cm

(c) 62 cm (d) 31 cm

16. In an equilateral triangle of side 24 cm, the length of the altitude will be

(a) $8\sqrt{2}$ (b) $8\sqrt{3}$

(c) $12\sqrt{2}$ (d) $12\sqrt{3}$

17. In an equilateral triangle ABC, AD is drawn perpendicular to BC meeting BC in D. The term AD^2 is equal to

(a) $3BD^2$ (b) $2BD^2$

(c) BD^2 (d) $\frac{1}{2}BD^2$

18. If $\sin\phi = \frac{1}{2}$, then $3\cos\phi - 4\cos^3\phi = ?$

(a) 0 (b) –1

(c) 1 (d) –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. A single letter is selected at random from the word PROBABILITY. The probability that the selected letter is a vowel is

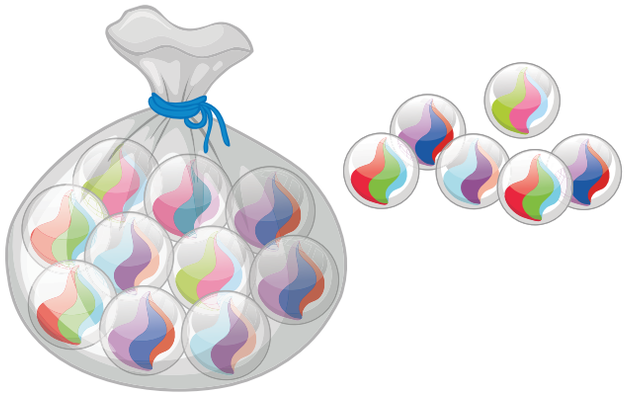
(a) $\frac{2}{11}$ (b) $\frac{3}{11}$

(c) $\frac{4}{11}$ (d) 0

SECTION B

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

21. When the marbles in a bag are divided evenly between two friends, there is one marble left over. When the same marbles are divided evenly among three friends, there is one marble left over. When the marbles are divided evenly among five friends, there is one marble left over.



What is the least possible number of marbles in the bag?

(a) 31 (b) 30

(c) 32 (d) 34

22. The ratio in which the point $(2, y)$ divides the join of $(-4, 3)$ and $(6, 3)$, hence the value of y is

(a) $2:3, y = 3$ (b) $3:2, y = 4$

(c) $3:2, y = 3$ (d) $3:2, y = 2$

23. If $\sin\theta + \cos\theta = \sqrt{2}$ then $\tan\theta + \cot\theta = ?$

(a) 1 (b) 2

(c) 3 (d) 4

24. If $2x + y = 23$ and $4x - y = 19$, the value of $(5y - 2x)$ and $(\frac{y}{x} - 2)$ will be

(a) $-\frac{5}{7}$ and 31 (b) 31 and $-\frac{5}{7}$

(c) 37 and $\frac{2}{7}$ (d) $\frac{2}{7}$ and 37

25. If α and β are zeroes and the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ is

(a) $\frac{15}{4}$ (b) $-\frac{15}{4}$

(c) 4 (d) 15

26. A number x is selected from the numbers 1, 2, 3 and then a second number y is randomly selected from the numbers 1, 4, 9 then the probability that the product xy of the two numbers will be less than 9 is

(a) $\frac{3}{7}$ (b) $\frac{4}{9}$

(c) $\frac{5}{9}$ (d) $\frac{7}{9}$

27. What is the probability of getting a sum of 9, when two dice are thrown simultaneously?

(a) $\frac{1}{9}$ (b) $\frac{7}{9}$

(c) $\frac{5}{9}$ (d) $\frac{2}{9}$

28. $\dfrac{1}{\text{cosec } A - \cot A} + \dfrac{1}{\text{cosec } A + \cot A} = ?$

(a) $\frac{2}{\sin A}$ (b) $\frac{1}{\sin A}$

(c) $\frac{1}{\cos A}$ (d) $\frac{2}{\cos A}$

29. The distance between the points $(0, 5)$ and $(-5, 0)$ is

(a) 5 (b) $5\sqrt{2}$

(c) $2\sqrt{5}$ (d) 10

30. From an airport, two aeroplanes start at the same time. If speed of first aeroplane due North is 500 km/h and that of other due East is 650 km/h then the approximate distance between the two aeroplanes after 2 hours will be

(a) 1890 km (b) 1120 km

(c) 1640 km (d) 2240 km

31. If $(3,2)$ and $(-3,2)$ are two vertices of an equilateral triangle which contains the origin, the third vertex will be

(a) $\left(1,\ 2-\sqrt{3}\right)$

(b) $\left(2,\ 1-3\sqrt{3}\right)$

(c) $\left(0,\ 2-3\sqrt{3}\right)$

(d) $\left(1,\ 2-\sqrt{3}\right)$

32. If $4\tan\theta = 3$, $\left(\dfrac{4\sin\theta - \cos\theta + 1}{4\sin\theta + \cos\theta - 1}\right) = ?$

(a) $\frac{11}{13}$ (b) $\frac{11}{15}$

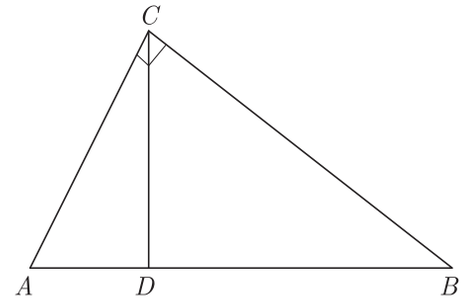
(c) $\frac{13}{11}$ (d) $\frac{15}{11}$

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. In given figure, $\angle ACB = 90^\circ$ and $CD \perp AB$, the term CD^2 is equal to



(a) $\frac{1}{2}BD \times AD$ (b) $BD \times AD$

(c) $\frac{1}{3}BD \times AD$ (d) $\frac{1}{4}BD \times AD$

35. The points $(3,0)$, $(6,4)$ and $(-1,3)$ are the vertices of a

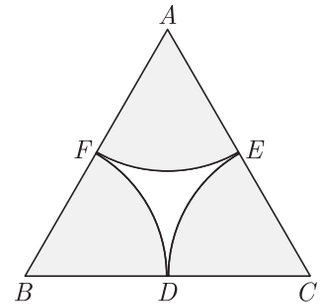
(a) equilateral triangle

(b) scalene triangle

(c) isosceles triangle

(d) right angled isosceles triangle

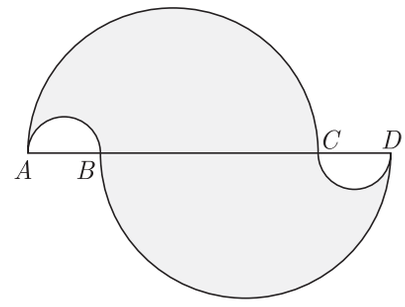
36. In given figure arcs are drawn by taking vertices A, B and C of an equilateral triangle of side 10 cm, to intersect the side BC, CA and AB at their respective mid-points D, E and F. What is the area of the shaded region? (Use $\pi = 3.14$).



(a) 180 cm^2 (b) 260 cm^2

(c) 39.25 cm^2 (d) 79.5 cm^2

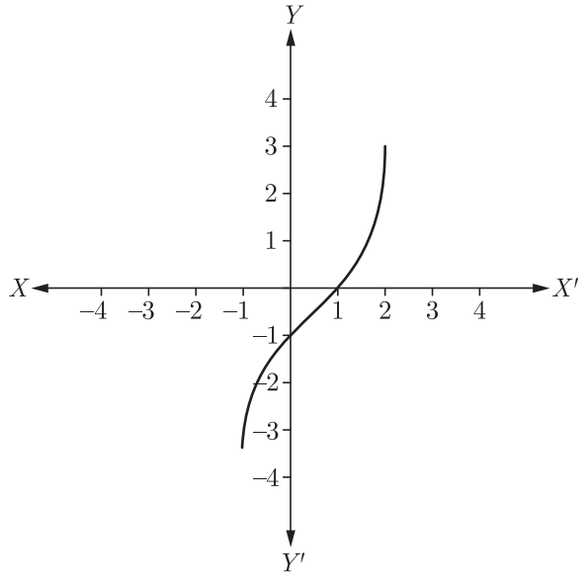
37. In given figure $AC = BD = 7$ cm and $AB = CD = 1.75$ cm. Semi-circles are drawn as shown in the figure. What is the area of the shaded region? Use $\pi = \frac{22}{7}$.



(a) 72 cm^2 (b) 36 cm^2

(c) 18 cm^2 (d) 54 cm^2

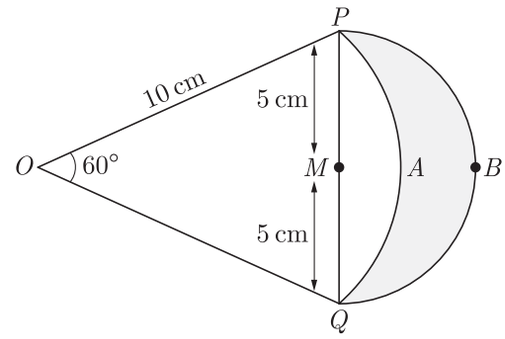
38. In given figure, the graph of a polynomial $p(x)$ is shown. The number of zeroes of $p(x)$ will be



(a) 1 (b) 2

(c) 3 (d) 4

39. Figure shows two arcs PAQ and PQB. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semi-circle drawn on PQ as diameter with centre M. If $OP = PQ = 10$ cm the area of shaded region will be



(a) $25\left(\sqrt{3} - \frac{\pi}{6}\right)\text{cm}^2$ (b) $50\left(\sqrt{3} - \frac{\pi}{6}\right)\text{cm}^2$

(c) $50\left(\sqrt{3} + \frac{\pi}{6}\right)\text{cm}^2$ (d) $25\left(\sqrt{3} + \frac{\pi}{6}\right)\text{cm}^2$

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

$99x + 101y = 499$ and $101x + 99y = 501$

(a) 3 and 6 (b) 3 and 2

(c) 2 and 3 (d) 6 and 3

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)

Birla Science Museum is the first Science and Technology Museum of the country, established in 1954. It houses exhibits and displays on science and technology where visitors can interact with the exhibits to make the understanding of science and technology easy and entertaining.

Birla Science Museum has set aside a children's room having planets and stars painted on the ceiling. Suppose an imaginary coordinate system is placed on the ceiling in the room with the centre of the ceiling at (0, 0,). Three particular stars are located at $S(-10, 5)$, $T(3, -8)$ and $R(-7, -4)$, where the coordinates represent the distance in feet from the center of the room.

41. What is the distance between $S(-10, 5)$ and $T(3, -8)$?

(a) $4\sqrt{29}$ (b) $2\sqrt{29}$

(c) $13\sqrt{2}$ (d) $16\sqrt{3}$

42. What is the distance between $R(-7, -4)$ and $T(3, -8)$?

(a) $4\sqrt{29}$ (b) $2\sqrt{29}$

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

43. What is the distance between $S(-10, 5)$ and $R(-7, -4)$?

(a) $4\sqrt{15}$ (b) $3\sqrt{10}$

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

44. Which star is farthest from the center of the room?

(a) $S(-10, 5)$

(b) $T(3, -8)$

(c) $R(-7, -4)$

(d) All are at same distance

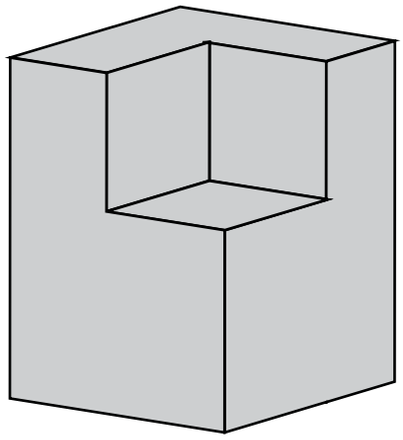
45. The distance of the point $P(-3, -4)$ from the x-axis (in units) is

(a) 3 (b) -3

(c) 4 (d) 5

Case Based Questions: (46-50)

A cuboidal solid of base x by $x+1$ is shown in figure. Height of original solid is $x+2$. A small cuboidal solid of base $x-2$ by $x-2$ and height 2 is cut from this solid as shown in figure.



46. Which of the following is correct polynomial for the volume of remaining solid?

(a) $x^3+x^2-10x-8$ (b) $x^3+x^2-10x+8$

(c) $x^3+x^2+10x+8$ (d) $x^3+x^2+10x-8$

47. What is the volume of remaining solid at $x=8$ inch?

(a) 432 cubic inch (b) 648 cubic inch

(c) 712 cubic inch (d) 568 cubic inch

48. What is the volume of remaining solid at $x=10$ inch?

(a) 1242 cubic inch (b) 1458 cubic inch

(c) 1712 cubic inch (d) 1192 cubic inch

49. If one zero of the quadratic polynomial x^2+3x+k is 2, then the value of k is

(a) 10 (b) -10

(c) -7 (d) -2

50. If -1 is a zero of the polynomial $f(x)=x^2-7x-8$, then other zero is

(a) 4 (b) 8

(c) 1 (d) –4

SAMPLE PAPER - 24 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(b)	Ch-1	7
2	(a)	Ch-2	S-4
3	(b)	Ch-4	8
4	(c)	Ch-4	21
5	(c)	Ch-8	8
6	(d)	Ch-4	31
7	(a)	Ch-6	9
8	(c)	Ch-1	15
9	(b)	Ch-3	8
10	(c)	Ch-5	7
11	(a)	Ch-1	30
12	(c)	Ch-1	S-23
13	(d)	Ch-6	25
14	(a)	Ch-6	38
15	(a)	Ch-7	41
16	(d)	Ch-4	41
17	(a)	Ch-4	52
18	(a)	Ch-6	54
19	(d)	Ch-3	18
20	(c)	Ch-8	19
21	(a)	Ch-1	D-40
22	(c)	Ch-5	18
23	(b)	Ch-6	68
24	(b)	Ch-3	30
25	(a)	Ch-2	9

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(c)	Ch-8	29
27	(a)	Ch-8	39
28	(a)	Ch-6	81
29	(b)	Ch-5	28
30	(c)	Ch-4	63
31	(c)	Ch-5	53
32	(c)	Ch-6	96
33	(d)	Ch-1	57
34	(b)	Ch-4	76
35	(d)	Ch-5	42
36	(c)	Ch-7	52
37	(b)	Ch-7	86
38	(a)	Ch-2	30
39	(a)	Ch-7	96
40	(b)	Ch-3	40
41	(c)	Ch-5	143
42	(a)	Ch-5	144
43	(b)	Ch-5	145
44	(a)	Ch-5	146
45	(c)	Ch-5	9
46	(d)	Ch-2	76
47	(b)	Ch-2	77
48	(d)	Ch-2	78
49	(b)	Ch-2	4
50	(b)	Ch-2	33

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