Sample/Pre-Board Paper 17

Class X Term 1 Exam Nov -Dec 2021

Mathematics (Standard) 041

Time Allowed: 90 minutes Maximum Marks: 40

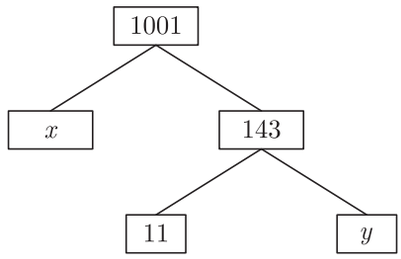
General Instructions:

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 values of x and y in the given figure are



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

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

2. What do you say about the solution of the pair of linear equations $y = 0$ and $y = -5$?

(a) no solution (b) unique solution

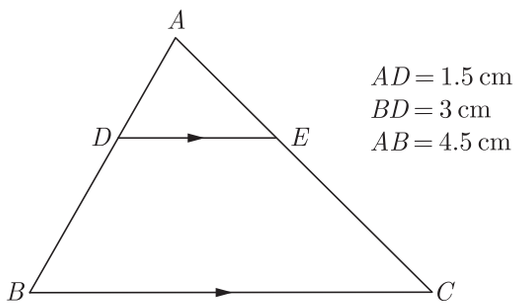
(c) infinitely solution (d) can't say anything

3. In ΔPQR, S and T are points on the sides PQ and PR respectively, such that $ST \parallel QR$. If $PT = 2$ cm and $TR = 4$ cm, what is the ratio of the areas of ΔPST and ΔPQR?

(a) 1 : 4 (b) 1 : 8

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

4. In the given figure, $DE \| BC$. If $AD = 1.5$ cm $BD = 2AD$, then what is the value of $\frac{\text{ar}(\Delta ADE)}{\text{ar}(\square BCED)}$?



(a) 1 : 4 (b) 1 : 8

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

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. If $\Delta ABC \sim \Delta APQ$ and $\text{ar}(\Delta APQ) = 4\text{ar}(\Delta ABC)$, ar (ΔABC), then the ratio of BC to PQ is

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

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

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

(a) $\frac{3}{5}$ (b) $\frac{3}{4}$

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

8. $2\sqrt{3}$ is

(a) an integer (b) a rational number

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

9. The pair of equations $x = a$ and $y = b$ graphically represents lines which are

(a) parallel

(b) intersecting at (b, a)

(c) coincident

(d) intersecting at (a, b)

10. The point on the x-axis which is equidistant from the points $A(-2, 3)$ and $B(5, 4)$ is

(a) (0, 2) (b) (2, 0)

(c) (3, 0) (d) $(-2, 0)$

11. Select the quadratic polynomial whose sum and product of a the zeroes are $\frac{21}{8}$ and $\frac{5}{16}$ respectively

(a) $16x^2 - 42x + 5$ (b) $\frac{1}{16}(16x^2 - 42x + 5)$

(c) $\frac{1}{12}(16x^2 + 42x + 5)$ (d) $\frac{1}{12}(16x^2 + 42x - 5)$

12. 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

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. $\tan^2 30^\circ \sin 30^\circ + \cos 60^\circ \sin^2 90^\circ \tan^2 60^\circ - 2\tan 45^\circ \cos^2 0^\circ \sin 90^\circ$

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

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

15. If the area of a semi-circular field is 15400 sq m, then perimeter of the field is

(a) $160\sqrt{2}$ m (b) $260\sqrt{2}$ m

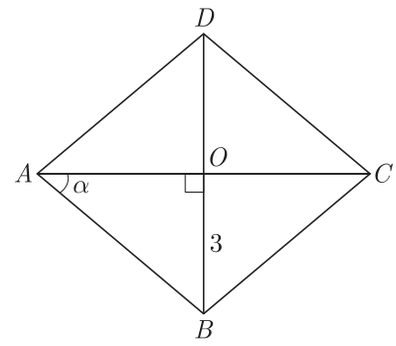
(c) $360\sqrt{2}$ m (d) $460\sqrt{2}$ m

16. The areas of two similar triangles ABC and PQR are in the ratio 9:16. If $BC = 4.5$ cm, then the length of QR is

(a) 4 cm (b) 4.5 cm

(c) 3 cm (d) 6 cm

17. $ABCD$ is a rhombus whose diagonal AC makes an angle α with AB. Here $\cos\alpha = \frac{2}{3}$ and $OB = 3$ cm.



The length of its diagonal BD is

(a) 6 cm (b) 5 cm

(c) $\frac{9}{\sqrt{5}}$ cm (d) $\frac{12}{\sqrt{5}}$ cm

18. $(\text{cosec}\,\theta + \cot\theta)^2 = ?$

(a) $\frac{\sec\theta+1}{\sec\theta-1}$ (b) $\frac{\sec\theta-1}{\sec\theta+1}$

(c) $\frac{1+\sec\theta}{1-\sec\theta}$ (d) $\frac{1-\sec\theta}{1+\sec\theta}$

19. 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) $12x + 8y = 42$

20. A die is thrown once. What is the probability of getting at most 2?

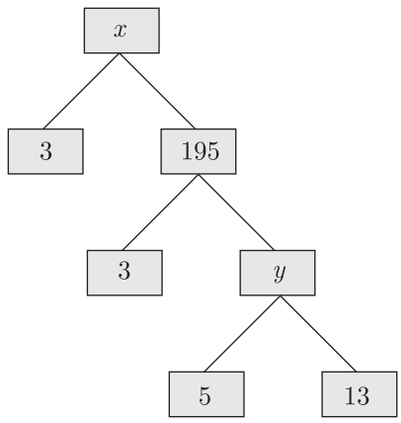
(a) $\frac{2}{3}$ (b) $\frac{1}{3}$

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

SECTION B

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

21. In the given factor tree what is the composite number x?



(a) 65 (b) 585

(c) 130 (d) 195

22. 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) $by = ax$

23. 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

24. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. The number of students in the class will be

(a) 24 (b) 36

(c) 32 (d) 28

25. If α and β are the zeroes the polynomial $2x^2 - 4x + 5$, the value of $(\alpha - \beta)^2$ is

(a) 2 (b) 1

(c) -1 (d) -6

26. From a deck of 52 playing cards, Jacks and kings of red colour and Queen and Aces of black colour are removed. The remaining cards are mixed and a card is drown at random.
What is the probability that the drawn card is a black queen ?

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

(c) 0 (d) $\frac{3}{52}$

27. Cards numbered 1 to 30 are put in a bag. A card is drawn at random. What is the probability that the drawn card is prime number greater than seven?

(a) $\frac{1}{15}$ (b) $\frac{1}{6}$

(c) $\frac{1}{12}$ (d) $\frac{1}{5}$

28. If $\tan 5\phi = 1$ then ϕ is equal to

(a) 9^o (b) 90^o

(c) 45^o (d) 30^o

29. Select the coordinates of a point A, where AB is diameter of a circle whose centre is $(2, -3)$ and B is the point $(1, 4)$.

(a) $(-10, 3)$ (b) $(3, -10)$

(c) $(-3, 10)$ (d) $(3, 10)$

30. If A be the area of a right triangle and b be one of the sides containing the right angle, the length of the altitude on the hypotenuse is

(a) $\frac{4Ab}{\sqrt{b^4+2A^2}}$ (b) $\frac{2Ab}{\sqrt{b^4+A^2}}$

(c) $\frac{2Ab}{\sqrt{b^4+4A^2}}$ (d) $\frac{4Ab}{\sqrt{b^4+A^2}}$

31. If the point $C(-1, 2)$ divides internally the line segment joining $A(2, 5)$ and $B(x, y)$ in the ratio 3 :4 the coordinates of B will be

(a) $(-2, -5)$ (b) $(-5, -2)$

(c) $(2, 5)$ (d) $(5, 2)$

32. $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = ?$

(a) $\frac{2}{2\sin^2\theta - 1}$ (b) $\frac{1}{1 - 2\cos^2\theta}$

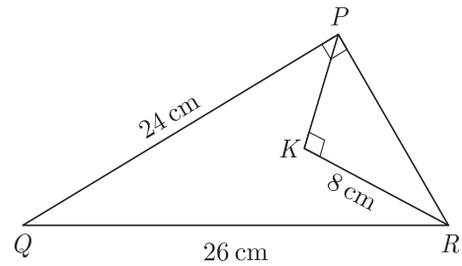
(c) $\frac{1}{1 + 2\cos^2\theta}$ (d) $\frac{1}{1 - 2\sin^2\theta}$

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 the given triangle $PQR, \angle QPR = 90^o, PQ = 24$ cm and $QR = 26$ cm and in $\Delta PKR, \angle PKR = 90^o$ and $KR = 8$ cm, the length of PK will be



(a) 3 cm (b) 4 cm

(c) 5 cm (d) 6 cm

35. What is the ratio in which the line $2x + 3y - 5 = 0$ divides the line segment joining the points $(8, -9)$ and $(2, 1)$?

(a) 8 : 1 (b) 7 : 6

(c) 7 : 2 (d) 2 : 5

36. The length of the minute hand of clock is 14 cm. What is the area swept by the minute hand in 15 minutes?

(a) 154 cm^2 (b) 87 cm^2

(c) 154π cm^2 (d) 87π cm^2

37. A horse is tethered to one corner of a rectangular field of dimensions 70 m $\times$ 52 m, by a rope of length 21 m. How much area of the field can it graze?

(a) 392 m^2 (b) 612 m^2

(c) 693 m^2 (d) 346.5 m^2

38. The zeroes of polynomial $p(x) = ax^2 + bx + c$ are reciprocal of each other if

(a) $b = 2a$ (b) $c = b$

(c) $b = a$ (d) $c = a$

39. If the perimeter of a semi-circular protractor is 36 cm, what is its diameter. (Use $\pi = \frac{22}{7}$)?

(a) 28 cm (b) 28π cm

(c) 14 cm (d) 14π cm

40. A cyclist, after riding a certain distance, stopped for half an hour to repair his bicycle, after which he completes the whole journey of 30 km at half speed in 5 hours. If the breakdown had occurred 10 km farther off, he would have done the whole journey in 4 hours. Find where the breakdown occurred and his original speed.
What was the original speed ?

(a) 10 km (b) 12 km

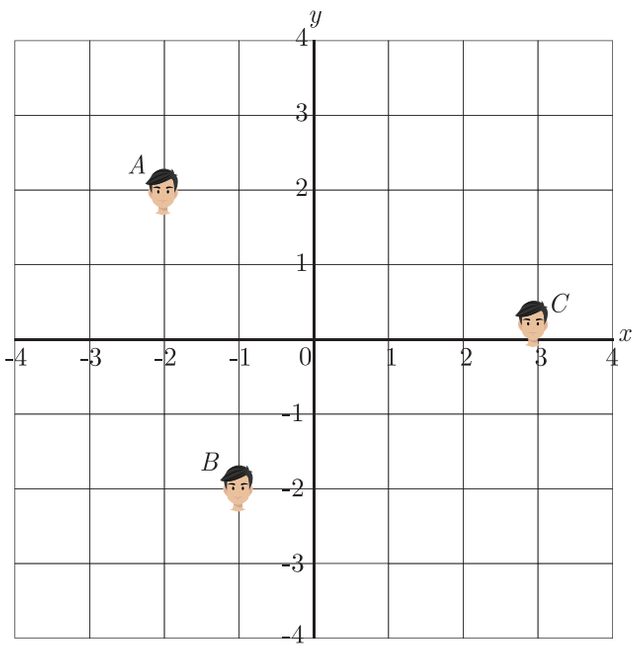
(c) 8 km (d) 7 km

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)

Ajay, Bhigu and Colin are fast friend since childhood. They always want to sit in a row in the classroom . But teacher doesn't allow them and rotate the seats row-wise everyday. Bhigu is very good in maths and he does distance calculation everyday. He consider the centre of class as origin and marks their position on a paper in a co-ordinate system. One day Bhigu make the following diagram of their seating position.



41. What are the coordinates of point A?

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

(c) $(-2, 2)$ (d) $(-2, -2)$

42. What is the distance of point A from origin ?

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

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

43. What is the distance between A and B ?

(a) $3\sqrt{19}$ (b) $3\sqrt{5}$

(c) $\sqrt{17}$ (d) $2\sqrt{5}$

44. What is the distance between B and C ?

(a) $3\sqrt{19}$ (b) $3\sqrt{5}$

(c) $2\sqrt{17}$ (d) $2\sqrt{5}$

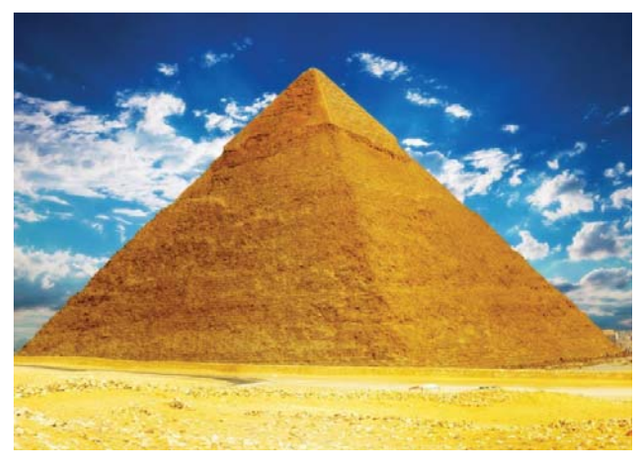
45. A point D lies on the line segment between points A and B such that $AD : DB = 4 : 3$. What are the the coordinates of point D ?

(a) $\left(\frac{10}{7}, \frac{2}{7}\right)$ (b) $\left(\frac{2}{7}, \frac{7}{7}\right)$

(c) $\left(-\frac{10}{7}, -\frac{2}{7}\right)$ (d) $\left(-\frac{2}{7}, -\frac{7}{7}\right)$

Case Based Questions: (46-50)

Pyramid, in architecture, a monumental structure constructed of or faced with stone or brick and having a rectangular base and four sloping triangular sides meeting at an apex. Pyramids have been built at various times in Egypt, Sudan, Ethiopia, western Asia, Greece, Cyprus, Italy, India, Thailand, Mexico, South America, and on some islands of the Pacific Ocean. Those of Egypt and of Central and South America are the best known.



The volume and surface area of a pyramid with a square base of area a^2 and height h is given by

$$V = \frac{ha^2}{3} \text{ and } S = a^2 + 2a\sqrt{(\tfrac{a}{2})^2 + h^2}$$

A pyramid has a square base and a volume of $3y^3 + 18y^2 + 27y$ cubic units.

46. If its height is y, then what polynomial represents the length of a side of the square base ?

(a) $9(y+3)$ (b) $9(y+3)^2$

(c) $3(y+3)$ (d) $3(y+3)^2$

47. If area of base is 576 metre, what is the side of base?

(a) 24 metre (b) 16 metre

(c) 13 metre (d) 12 metre

48. What is the height of pyramid at above area of base ?

(a) 4 metre (b) 6 metre

(c) 5 metre (d) 12 metre

49. What is the ratio of length of side to the height ?

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

(c) $\frac{5}{24}$ (d) $\frac{24}{5}$

50. What is surface area of pyramid ?

(a) 800 m^2 (b) 2400 m^2

(c) 1200 m^2 (d) 1600 m^2

SAMPLE PAPER - 12 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(a)	Ch-1	16
2	(a)	Ch-3	25
3	(c)	Ch-4	S-121
4	(b)	Ch-4	S-152
5	(a)	Ch-8	5
6	(b)	Ch-4	13
7	(b)	Ch-6	4
8	(c)	Ch-1	12
9	(d)	Ch-3	14
10	(b)	Ch-5	19
11	(b)	Ch-2	S-3
12	(d)	Ch-1	6
13	(b)	Ch-6	24
14	(d)	Ch-6	97
15	(c)	Ch-7	5
16	(d)	Ch-4	9
17	(a)	Ch-4	D-81
18	(a)	Ch-6	118
19	(b)	Ch-3	28
20	(b)	Ch-8	S-2
21	(b)	Ch-1	34
22	(b)	Ch-5	41
23	(b)	Ch-6	52
24	(b)	Ch-3	85
25	(d)	Ch-2	40

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(c)	Ch-8	D-166
27	(d)	Ch-8	129
28	(a)	Ch-6	123
29	(b)	Ch-5	S-2
30	(c)	Ch-4	140
31	(b)	Ch-5	S-22
32	(a)	Ch-6	83
33	(c)	Ch-1	58
34	(d)	Ch-4	43
35	(a)	Ch-5	76
36	(a)	Ch-7	S-2
37	(d)	Ch-7	S-12
38	(d)	Ch-2	39
39	(c)	Ch-7	S-22
40	(a)	Ch-3	D-100
41	(c)	Ch-5	117
42	(b)	Ch-5	118
43	(c)	Ch-5	119
44	(d)	Ch-5	120
45	(c)	Ch-5	121
46	(c)	Ch-2	99
47	(a)	Ch-2	100
48	(c)	Ch-2	101
49	(d)	Ch-2	102
50	(c)	Ch-2	103

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