Sample/Pre-Board Paper 20

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.
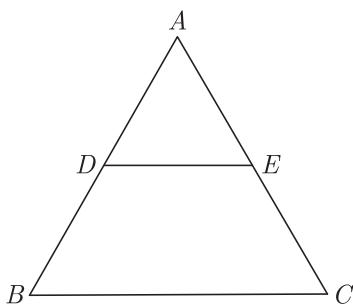
1. Which of the following will have a terminating decimal expansion?

- (a) $\dfrac{77}{210}$
- (b) $\dfrac{23}{30}$
- (c) $\dfrac{125}{441}$
- (d) $\dfrac{23}{8}$

2. What do you say about the lines represented by ?
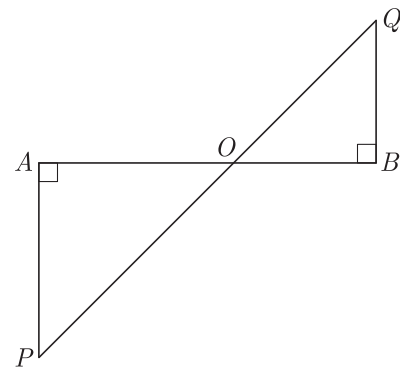$2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$

- (a) lines are parallel
- (b) lines are coincident
- (c) lines are intersecting
- (d) can't say anything

3. In Figure, $DE \,||\, BC$, $AD = 1\,\text{cm}$ and $BD = 2\,\text{cm}$. What is the ratio of the $\text{ar}(\Delta ABC)$ to the $\text{ar}(\Delta ADE)$?

- (a) 9 : 1
- (b) 4 : 1
- (c) 3 : 1
- (d) 8 : 1

4. In the given figure, if $\angle A = 90^o, \angle B = 90^o$, $OB = 4.5$ cm $OA = 6$ cm and $AP = 4$ cm then QB will be

- (a) 2 cm
- (b) 3 cm
- (c) 4 cm
- (d) 6 cm

5. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, then how many tickets has she bought?

- (a) 40
- (b) 240
- (c) 480
- (d) 750

6. The corresponding sides of two similar triangles are in the ratio 3 : 4, then the ratio of the areas of triangles is ....
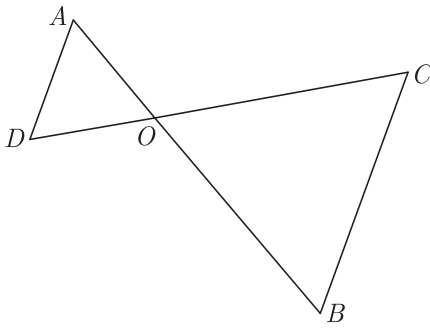
- (a) $\frac{1}{3}$
- (b) $\frac{1}{9}$
- (c) $\frac{9}{16}$
- (d) $\frac{3}{4}$

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

- (a) 0
- (b) 1
- (c) $\dfrac{1}{2}$
- (d) $\dfrac{\sqrt{3}}{2}$

**8.** The total number of factors of prime number is

- (a) 1
- (b) 0
- (c) 2
- (d) 3

9. For what value of k, $2x + 3y = 4$ and $(k+2)x + 6y = 3k + 2$ will have infinitely many solutions ?

(a) $k = 2$　　　　　　(b) $k = 3$

(c) $k \neq 3$　　　　　　(d) $k = 4$

10. If $x - 2y + k = 0$ is a median of the triangle whose vertices are at points $A(-1, 3)$, $B(0, 4)$ and $C(-5, 2)$, then the value of k is

(a) 2　　　　　　(b) 4

(c) 6　　　　　　(d) 8

11. If a and b are the zeroes of polynomial $x^2 + ax + b$, the values of a and b are

(a) 1 and 2　　　　　　(b) 1 and –2

(c) –2 and 1　　　　　　(d) 2 and 1

12. 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

13. If A and B are acute angles and $\sin A = \cos B$, then the value of $A + B$ is

(a) 60°　　　　　　(b) 180°

(c) 90°　　　　　　(d) 120°

14. $\dfrac{2\cos^2 60° + 3\sec^2 30° - 2\tan^2 45°}{\sin^2 30° + \cos^2 45°} = ?$

(a) $\frac{15}{7}$　　　　　　(b) $\frac{10}{3}$

(c) $\frac{15}{8}$　　　　　　(d) $\frac{10}{7}$

15. If the radius of a circle is diminished by 10%, then its area is diminished by

(a) 10%　　　　　　(b) 19%

(c) 36%　　　　　　(d) 20%

16. If $\Delta ABC \sim \Delta PQR$, $\dfrac{AB}{PQ} = \dfrac{1}{3}$, then $\dfrac{\text{ar}\,\Delta ABC}{\text{ar}\,\Delta PQR}$ will be

(a) $\frac{1}{3}$　　　　　　(b) $\frac{1}{9}$

(c) $\frac{8}{9}$　　　　　　(d) $\frac{5}{9}$

17. In the given figure, if $OA \times OB = OC \times OD$, which of the option is correct ?

(a) $\angle A = \angle C$ and $\angle B = \angle D$

(b) $\angle A = \angle B$ and $\angle C = \angle D$

(c) $\angle A = \angle D$ and $\angle B = \angle C$

(d) Above all

18. $\sin A$ is equal to

(a) $\sqrt{1 - \sec^2 A}$

(b) $\sqrt{\sec^2 A - 1}$

(c) $\dfrac{\sec A}{\sqrt{\sec^2 A - 1}}$

(d) $\dfrac{\sqrt{\sec^2 A - 1}}{\sec A}$

19. Given the linear equation $2x + 3y - 8 = 0$, select another linear equation in two variables such that the geometrical representation of the pair so formed is parallel lines.

(a) $5x + 2y - 9 = 0$　　　　(b) $6x + 9y + 7 = 0$

(c) $4x + 6y - 16 = 0$　　　　(d) above all

20. If E be an event such that $P(E) = \frac{3}{7}$, what is $P(\text{not } E)$ equal to?

(a) $\frac{1}{7}$　　　　　　(b) $\frac{2}{7}$

(c) $\frac{3}{7}$　　　　　　(d) $\frac{4}{7}$

SECTION B

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

21. What are the missing numbers c and d in the given factor tree:
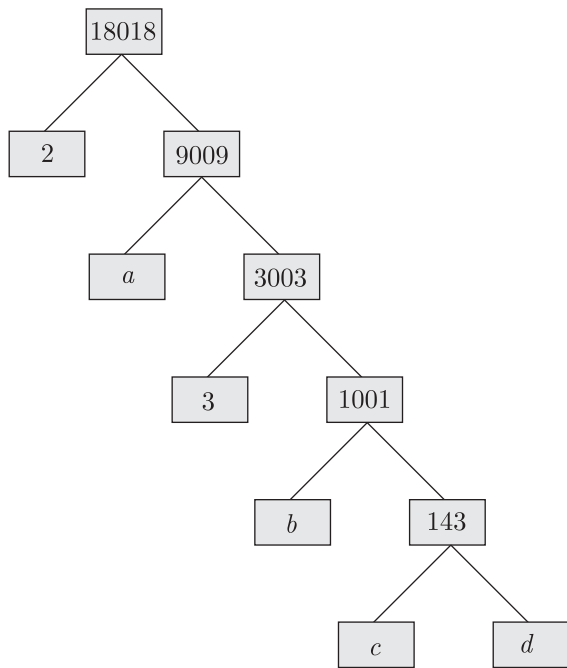
(a) 3 and 7   (b) 13 and 11

(c) 6 and 9   (d) 5 and 4

22. The points (a, a), $(-a, -a)$ and $(-\sqrt{3}\,a, \sqrt{3}\,a)$ are the vertices of $\_\_\_\_\_$

(a) equilateral triangle

(b) scalene triangle

(c) isosceles triangle

(d) right angled isosceles triangle

23. If $\sin\theta - \cos\theta = \frac{1}{2}$, the value of $\sin\theta + \cos\theta$ will be

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

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

24. A two digit number is obtained by either multiplying the sum of digits by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3. The number will be

(a) 83   (b) 98

(c) 77   (d) 53

25. If sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then the value of k will be

(a) 1   (b) 4

(c) 6   (d) 9

26. A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, what is the probability that it bears a two digit number?

(a) $\frac{9}{10}$ (b) $\frac{1}{9}$

(c) $\frac{11}{90}$ (d) $\frac{8}{90}$

27. A game consists of tossing a one-rupee coin three times and noting its outcome each time. What is the probability of getting three heads?

(a) $\frac{1}{8}$ (b) $\frac{3}{8}$

(c) $\frac{4}{8}$ (d) $\frac{5}{8}$

28. For best illumination of a piece of art, a lighting specialist for an art gallery recommends that a ceiling-mounted light be 3 meter from the piece of art and that the angle of depression of the light be $30°$. How far from a wall should the light be placed so that the recommendations of the specialist are met? Notice that the art extends outward 10 cm from the wall.
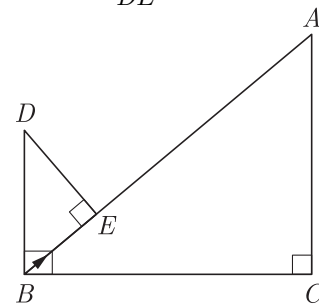

(a) 2.7 m   (b) 1.8 m

(c) 3.9 m   (d) 3.1 m

29. If the centre and radius of circle is $(3, 4)$ and 7 units respectively,, then what it the position of the point $A(5,8)$ with respect to circle?

(a) inside   (b) outside

(c) on circle   (d) can't say

30. In the given figure, $DB \perp BC, DE \perp AB$ and $AC \perp BC$. The term $\frac{BE}{DE}$ is equal to


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

(c) $AC \times BC$ (d) $AC + BC$

31. The line segment joining the points $A(3, -4)$ and $B(1,2)$ is trisected at the points P and Q. Find the coordinate of the PQ.

(a) $\left(\frac{4}{3}, -2\right)$`   (b) $\left(-2, \frac{7}{3}\right)$

(c) $\left(\frac{7}{3}, -2\right)$ (d) $\left(-2, \frac{4}{3}\right)$

32. If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, then $x^2 + y^2$ is equal to

(a) 1   (b) 2

(c) 3   (d) 4

33. An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

(a) 12   (b) 16

(c) 714   (d) 1428

34. The length of AQ is

(a) 2.80 cm   (b) 5.60 cm

(c) 3.25 cm   (d) 2.10 cm

35. Two friends Seema and Aditya work in the same office at Delhi. In the Christmas vacations, both decided to go to their hometown represented by Town A and Town B respectively in the figure given below. Town A and Town B are connected by trains from the same station C (in the given figure) in Delhi. Based on the given situation answer the following questions:
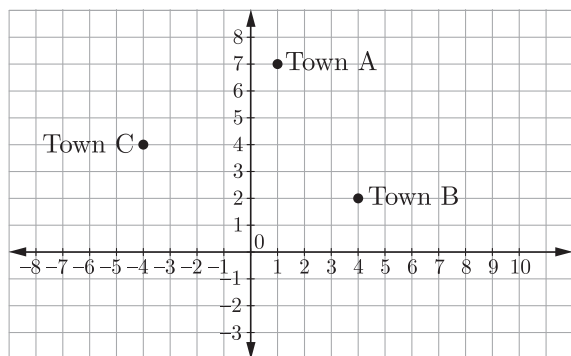


Who will travel more distance, Seema or Aditya, to reach to their hometown?

(a) Distance travelled by Aditya is $\sqrt{68}$ units and Aditya travels more distance.

(a) Distance travelled by Seema is $\sqrt{68}$ units and Seema travels more distance.

(a) Distance travelled by Seema is $\sqrt{78}$ units and

Seema travels more distance.

(a) Distance travelled by Aditya is $\sqrt{78}$ units and Aditya travels more distance.

36. The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. What is the area of the sector?

(a) 62 cm^2 (b) 128 cm^2

(c) 31 cm^2 (d) 15.6 cm^2

37. If circumference of a circle is 44 cm, then what will be the area of the circle?

(a) 154π cm^2 (b) 44π cm^2

(c) 88π cm^2 (d) 22π cm^2

38. If α and β are the zeroes of the polynomial $6y^2 - 7y + 2$, Select the quadratic polynomial whose zeroes are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

(a) $y^2 + 7y + 6$ (b) $y^2 + 7y - 6$

(c) $y^2 - 7y + 6$ (d) $y^2 - 3.5y + 3$

39. In the figure, ΔABC is in the semi-circle, what is the area of the shaded region given that $AB = BC = 4$ cm? (Use $\pi = 3.14$)
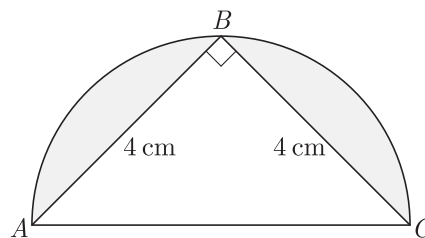
(a) $9.12\,\text{cm}^2$ (b) $4.56\,\text{cm}^2$

(c) $2.16\,\text{cm}^2$ (d) $12.16\,\text{cm}^2$

40. At a certain time in a deer, the number of heads and the number of legs of deer and human visitors were counted and it was found that there were 39 heads and 132 legs.
What is the number of deer visitors in the park ?

(a) 12   (b) 27

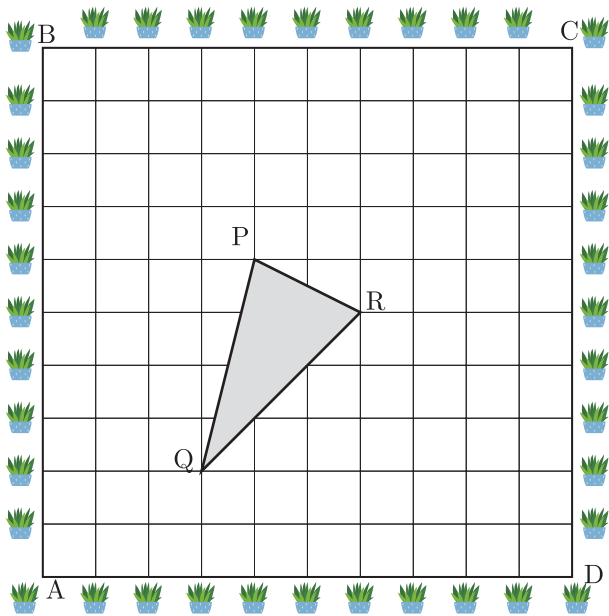(c) 16   (d) 38

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 - 15 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(d)	Ch-1	19
2	(b)	Ch-3	33
3	(a)	Ch-4	S-127
4	(b)	Ch-4	32
5	(c)	Ch-8	13
6	(c)	Ch-4	26
7	(a)	Ch-6	9
8	(c)	Ch-1	2
9	(a)	Ch-3	S-3
10	(d)	Ch-5	22
11	(b)	Ch-2	S-8
12	(a)	Ch-1	17
13	(c)	Ch-6	40
14	(b)	Ch-6	103
15	(b)	Ch-7	11
16	(b)	Ch-4	28
17	(a)	Ch-4	55
18	(d)	Ch-6	86
19	(b)	Ch-3	S-4
20	(d)	Ch-8	S-5
21	(b)	Ch-1	39
22	(a)	Ch-5	46
23	(b)	Ch-6	62
24	(a)	Ch-3	81
25	(d)	Ch-2	31

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(a)	Ch-8	162
27	(a)	Ch-8	121
28	(a)	Ch-6	138
29	(a)	Ch-5	S-6
30	(a)	Ch-4	146
31	(c)	Ch-5	S-31
32	(a)	Ch-6	84
33	(a)	Ch-1	S-29
34	(c)	Ch-4	D-68
35	(a)	Ch-5	D-86
36	(d)	Ch-7	S-5
37	(a)	Ch-7	S-15
38	(d)	Ch-2	S-39
39	(b)	Ch-7	S-25
40	(b)	Ch-3	D-96
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