Sample/Pre-Board Paper 6

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 sum of exponents of prime factors in the prime-factorisation of 196 is

(a) 3 (b) 4

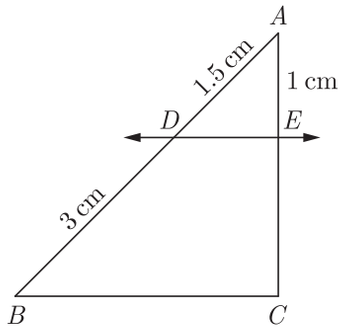
(c) 5 (d) 2

2. The value of k for which the system of linear equations $x+2y=3$, $5x+ky+7=0$ is inconsistent is

(a) $-\frac{14}{3}$ (b) $\frac{2}{5}$

(c) 5 (d) 10

3. In the given figure, $DE \parallel BC$. The value of EC is



(a) 1.5 cm (b) 3 cm

(c) 2 cm (d) 1 cm

4. In an equilateral triangle of side $3\sqrt{3}$ cm the length of the altitude will be

(a) 6.5 cm (b) 5.5 cm

(c) 4.5 cm (d) 7.5 cm

5. The point P on x-axis equidistant from the points $A(-1,0)$ and $B(5,0)$ is

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

(c) (3, 0) (d) $(-3,5)$

6. ΔABC is an equilateral triangle with each side of length $2p$. If $AD \perp BC$ then the value of AD is

(a) $\sqrt{3}$ (b) $\sqrt{3}\,p$

(c) $2p$ (d) $4p$

7. Given that $\sin\alpha = \frac{\sqrt{3}}{2}$ and $\cos\beta = 0$, then the value of $\beta - \alpha$ is

(a) 0° (b) 90°

(c) 60° (d) 30°

8. The decimal representation of $\frac{11}{2^3 \times 5}$ will

(a) terminate after 1 decimal place

(b) terminate after 2 decimal place

(c) terminate after 3 decimal places

(d) not terminate

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 co-ordinates of the point which is reflection of point $(-3,5)$ in x-axis are

(a) (3, 5) (b) (3, -5)

(c) $(-3,-5)$ (d) $(-3,5)$

11. If one zero of a quadratic polynomial (kx^2+3x+k) is 2, then the value of k is

(a) $\frac{5}{6}$ (b) $-\frac{5}{6}$

(c) $\frac{6}{5}$ (d) $-\frac{6}{5}$

12. Which of the following are the HCF and LCM of 404 and 96 ?

(a) 4 and 9696 (b) 6 and 38784

(c) 8 and 1486 (d) 6 and 9648

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

(a) 0 (b) 1

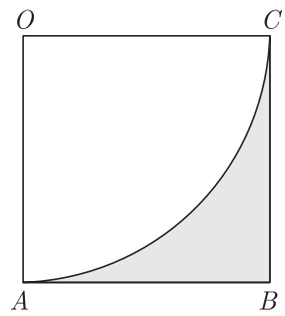
(c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

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

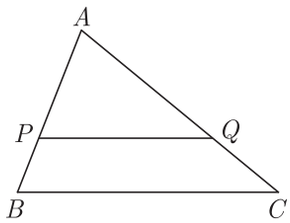
15. In the adjoining figure, $OABC$ is a square of side 7 cm. OAC is a quadrant of a circle with O as centre. The area of the shaded region is



(a) $10.5\ \text{cm}^2$ (b) $38.5\ \text{cm}^2$

(c) $49\ \text{cm}^2$ (d) $11.5\ \text{cm}^2$

16. In the given figure, P and Q are points on the sides AB and AC respectively of a triangle ABC. PQ is parallel to BC and divides the triangle ABC into 2 parts, equal in area. The ratio of $PA:AB =$



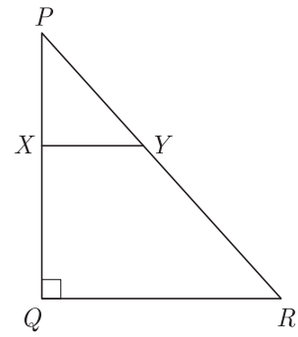
(a) 1 : 1 (b) $(\sqrt{2}-1):\sqrt{2}$

(c) $1:\sqrt{2}$ (d) $(\sqrt{2}-1):1$

Case Based Questions:

In the given figure, PQR is a triangle right angled at Q and $XY \| QR$. If $PQ = 6$ cm, $PY = 4$ cm and $PX:XQ = 1:2$.

17. The length of PR will be



(a) 12 cm (b) $2\sqrt{3}$ cm

(c) $6\sqrt{3}$ cm (d) 18 cm

18. If $4\tan\theta = 3$, then $\left(\frac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}\right)$ is equal to

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

(c) $\frac{1}{2}$ (d) $\frac{3}{4}$

19. 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

20. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

(a) 7 (b) 14

(c) 21 (d) 28

SECTION B

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

21. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, where x, y are prime numbers, then HCF (a, b) is

(a) xy (b) xy^2

(c) x^3y^3 (d) x^2y^2

22. The point P on x-axis equidistant from the points $A(-1, 0)$ and $B(5, 0)$ is

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

(c) (3, 0) (d) $(-3, 5)$

23. If $\sin\theta + \cos\theta = \sqrt{2}\cos\theta$, $(\theta \neq 90^\circ)$ then the value of $\tan\theta$ is

(a) $\sqrt{2}-1$ (b) $\sqrt{2}+1$

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

24. The 2 digit number which becomes $\frac{5}{6}$th of itself when its digits are reversed. The difference in the digits of the number being 1, then the two digits number is

(a) 45 (b) 54

(c) 36 (d) None of these

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

(a) -7 (b) 1

(c) -1 (d) -6

26. If a number x is chosen at random from the numbers $-2, -1, 0, 1, 2$. Then, the probability that $x^2 < 2$ is

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

(c) $\frac{1}{5}$ (d) $\frac{3}{5}$

27. A dice is rolled twice. What is the probability that 5 will not come up either time?

(a) $\frac{5}{18}$ (b) $\frac{25}{36}$

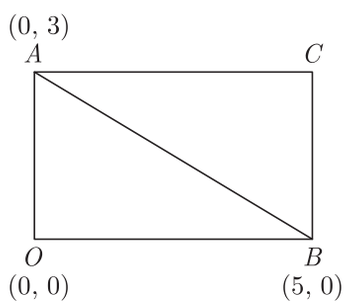
(c) $\frac{13}{36}$ (d) $\frac{11}{36}$

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

(a) 0 (b) 1/2

(c) 1 (d) 3/2

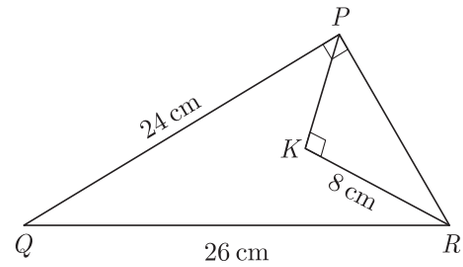
29. If $AOBC$ is a rectangle whose three vertices are $A(0,3)$, $O(0,0)$ and $B(5,0)$, then the length of its diagonal is



(a) 5 (b) 3

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

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



(a) 3 cm (b) 4 cm

(c) 5 cm (d) 6 cm

31. Point $(-1, y)$ and $B(5,7)$ lie on a circle with centre $O(2, -3y)$. What is the radius of the circle?

(a) 5 (b) 2

(c) 3 (d) 4

32. $\dfrac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = ?$

(a) $\cos\theta - \sin\theta$ (b) $\sin\theta - \cos\theta$

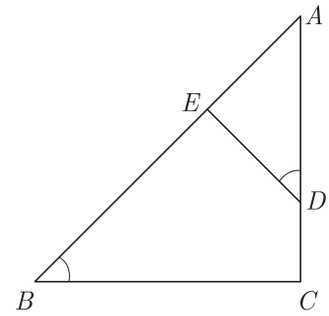
(c) $\sin\theta + \cos\theta$ (d) $\operatorname{cosec}\theta + \cot\theta$

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. In ΔABC, if $\angle ADE = \angle B$, then prove that $\Delta ADE \sim \Delta ABC$. Also, if $AD = 7.6$ cm, $AE = 7.2$ cm, $BE = 4.2$ cm and $BC = 8.4$ cm, then length DE will be



(a) 5.6 cm (b) 2.8 cm

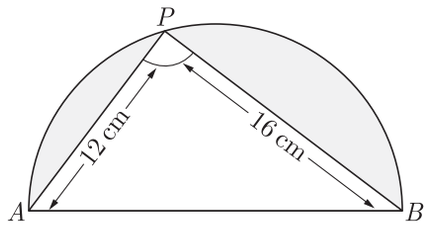
(c) 4.8 cm (d) 3.8 cm

35. If the distances of $P(x,y)$ from $A(5,1)$ and $B(-1,5)$ are equal, then

(a) $3x = 4y$ (b) $2x = 3y$

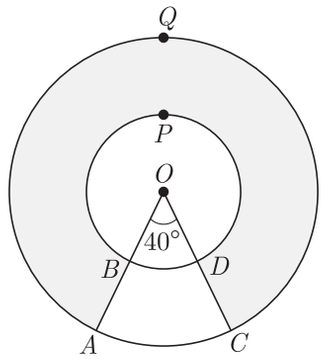
(c) $3x = 2y$ (d) $4x = 3y$

36. In the given figure, AB is the diameter where $AP = 12$ cm and $PB = 16$ cm. If the value of π is taken 3, what is the perimeter of the shaded region?



(a) 58 cm (b) 116 cm
(c) 29 cm (d) 156 cm

37. In the given figure, what is the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC = 40°$? Use $\pi = \frac{22}{7}$.

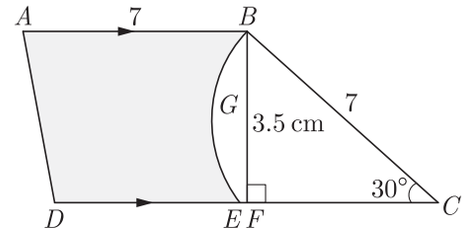


(a) 165 cm^2 (b) 189 cm^2
(c) 210 cm^2 (d) 411 cm^2

38. 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

39. Adjoining fig, $ABCD$ is a trapezium with $AB \,||\, DC$ and $\angle BCD = 30°$. Fig. $BGEC$ is a sector of a circle with centre C and $AB = BC = 7$ cm, $DE = 4$ cm and $BF = 3.5$ cm, then What is the area of the shaded region? Use $\pi = \frac{22}{7}$.



(a) 24.67 cm^2 (b) 12.34 cm^2
(c) 28.14 cm^2 (d) 18.67 cm^2

40. What are the values of x and y for the following system of equations.
$\frac{21}{x} + \frac{47}{y} = 110,\ \frac{47}{x} + \frac{21}{y} = 162,\ x,\ y \neq 0$

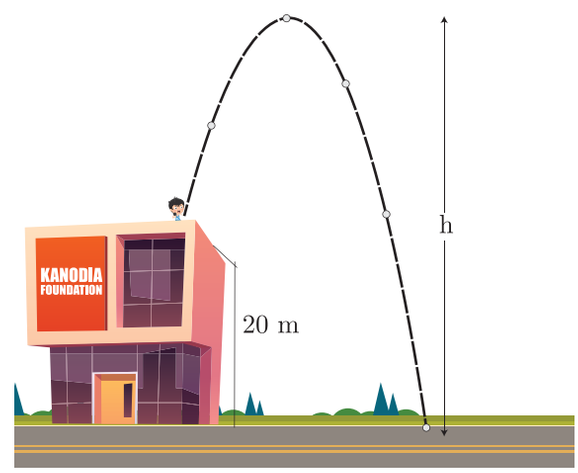
(a) $\frac{1}{3}$ and $\frac{1}{2}$ (b) $\frac{1}{3}$ and 1
(c) $\frac{1}{2}$ and $\frac{1}{3}$ (d) $\frac{1}{2}$ and 1

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)

Lavanya throws a ball upwards, from a rooftop, which is 20 m above from ground. It will reach a maximum height and then fall back to the ground. The height of the ball from the ground at time t is h, which is given by $h = -4t^2 + 16t + 20$.



41. What is the height reached by the ball after 1 second?

(a) 64 m (b) 128 m
(c) 32 m (d) 20 m

42. What is the maximum height reached by the ball?

(a) 54 m (b) 44 m

(c) 36 m (d) 18 m

43. How long will the ball take to hit the ground?

(a) 4 seconds (b) 3 seconds

(c) 5 seconds (d) 6 seconds

44. What are the two possible times to reach the ball at the same height of 32 m?

(a) 1 and 3 seconds (b) 1 and 4 seconds

(c) 1 and 2 seconds (d) 1 and 5 seconds

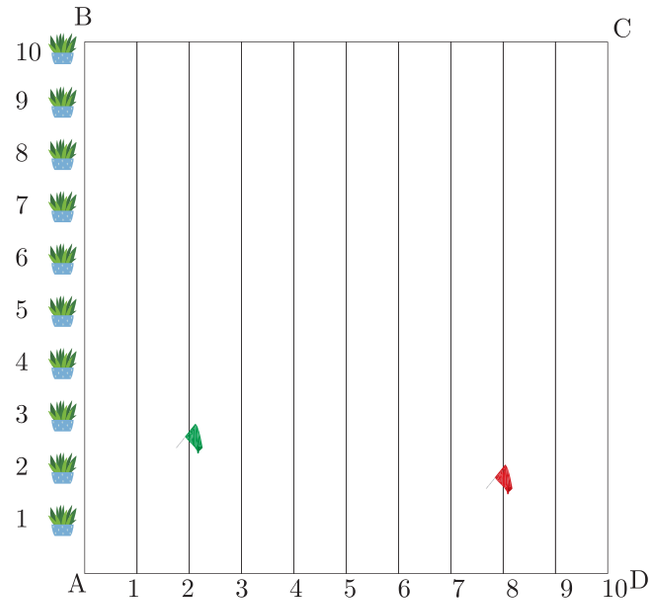
45. Where is the ball after 5 seconds ?

(a) at the ground (b) rebounds

(c) at highest point (d) fall back

Case Based Questions: (46-50)

To conduct sports day activities, in a rectangular shaped school ground $ABCD$, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AB, as shown in figure. Nishtha runs $\frac{1}{4}$th the distance AB on the 2nd line and posts a green flag. Suman runs $\frac{1}{5}$th the distance AB on the 8th line and posts a red flag.



46. What is the position of green flag ?

(a) (2, 25) (b) (25, 4)

(c) (25, 2) (d) (4, 25)

47. What is the position of red flag ?

(a) (20, 4) (b) (8, 20)

(c) (20, 8) (d) (4, 20)

48. What is the distance between both the flags?

(a) $\sqrt{51}$ (b) $3\sqrt{3}$

(c) $\sqrt{61}$ (d) $2\sqrt{3}$

49. What is the distance of red flag from point A ?

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

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

50. If Rakhi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?

(a) (20, 4) (b) (22.5, 5)

(c) (4, 20) (d) (5, 22.5)

SAMPLE PAPER - 1 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(b)	Ch-1	1
2	(d)	Ch-3	1
3	(c)	Ch-4	1
4	(c)	Ch-4	39
5	(a)	Ch-8	1
6	(b)	Ch-4	3
7	(d)	Ch-6	1
8	(c)	Ch-1	4
9	(d)	Ch-3	14
10	(c)	Ch-5	3
11	(d)	Ch-2	1
12	(a)	Ch-1	S-1
13	(a)	Ch-6	9
14	(c)	Ch-6	6
15	(a)	Ch-7	2
16	(c)	Ch-4	11
17	(a)	Ch-4	48
18	(c)	Ch-6	11
19	(b)	Ch-3	8
20	(b)	Ch-8	12
21	(b)	Ch-1	14
22	(a)	Ch-5	1
23	(a)	Ch-6	3
24	(b)	Ch-3	4
25	(a)	Ch-2	34

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(d)	Ch-8	24
27	(a)	Ch-8	176
28	(c)	Ch-6	18
29	(c)	Ch-5	27
30	(d)	Ch-4	43
31	(a)	Ch-5	11
32	(d)	Ch-6	129
33	(a)	Ch-1	S-29
34	(a)	Ch-4	78
35	(c)	Ch-5	83
36	(a)	Ch-7	38
37	(d)	Ch-7	58
38	(a)	Ch-2	9
39	(d)	Ch-7	69
40	(b)	Ch-3	43
41	(c)	Ch-2	94
42	(c)	Ch-2	95
43	(c)	Ch-2	96
44	(a)	Ch-2	97
45	(b)	Ch-2	98
46	(a)	Ch-5	126
47	(b)	Ch-5	127
48	(c)	Ch-5	128
49	(a)	Ch-5	129
50	(d)	Ch-5	130

*** S- = Self Test Question**