Sample/Pre-Board Paper 28

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. 225 can be expressed as
 - (a) 5×3^2 (b) $5^2 \times 3$
 - (c) $5^2 \times 3^2$ (d) $5^3 \times 3$
- 2. 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) $\frac{1}{12}(16x^2 + 42x 5)$
- 3. 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

4. In $\triangle ABC$, $AB = 6\sqrt{3}$ cm, AC = 12 cm and BC = 6 cm, then $\angle B = \dots$.

- (a) 30°
- (b) 60°
- (c) 45°
- (d) 90°
- 5. If a card is selected from a deck of 52 cards, then the probability of its being a red face card is
 - (a) $\frac{3}{26}$
 - (b) $\frac{3}{13}$
 - (c) $\frac{2}{13}$
 - (d) $\frac{1}{2}$

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



(a) 2 cm	(b)	3 cm
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- (c) 4 cm (d) 6 cm
- 7. If $\sin \alpha = \frac{1}{2}$ and $\cos \beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ (a) 0° (b) 30°
 - (c) 60° (d) 90°
- 8. If two positive integers a and b are written as $a = x^3 y^2$ and $b = xy^3$, where x, y are prime numbers, then HCF (a, b) is
 - (a) *xy*
 - (b) xy^2
 - (c) $x^3 y^3$
 - (d) $x^2 y^2$
 - , -
- **9.** The pair of equations $3^{x+y} = 81, 81^{x-y} = 3$ has
 - (a) no solution
 - (b) unique solution
 - (c) infinitely many solutions

(d)
$$x = 2\frac{1}{8}, y = 1\frac{7}{8}$$

- 10. Distance of point P(3,4) from x-axis is
 - (a) 3 units
 - (b) 4 units
 - (c) 5 units
 - (d) 1 units
- 11. a and b are two positive integers such that the least prime factor of a is 3 and the least prime factor of b is 5. Then the least prime factor of (a + b) will be
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- Select the smallest number which is divisible by both 306 and 657.
 - (a) 16498
 - (b) 22398
 - (c) 22338
 - (d) 16414
- **13.** If $\cot \theta = \frac{12}{5}$, then the value of $\sin \theta$ is
 - (a) $\frac{5}{13}$
 - (b) $\frac{8}{12}$
 - (c) $\frac{12}{5}$
 - (d) $\frac{13}{5}$
- 14. What happens to value of $\cos \theta$ when θ increases from 0° to 90° .
 - (a) $\cos\theta$ decreases from 1 to 0.
 - (b) $\cos\theta$ increases from 0 to 1.
 - (c) $\cos\theta$ increases from $\frac{1}{2}$ to 1
 - (d) $\cos\theta$ decreases from 1 to $\frac{1}{2}$
- 15. If the perimeter and the area of the circle are numerically equal, what is the radius of the circle?
 - (a) 1
 - (b) 2
 - (c) 4
 - (d) 8
- 16. What is the altitude of an equilateral triangle when each of its side is a ?
 - (a) $\frac{1}{\sqrt{3}}a$
 - (b) $\frac{\sqrt{3}}{3}a$
 - (c) $\frac{\sqrt{3}}{4}a$
 - (d) $\frac{\sqrt{3}}{2}a$

17. In the figure, PQRS is a trapezium in which PQ||RS. On PQ and RS, there are points E and F respectively such that EF intersects SQ at G. Now the term $EQ \times GS$ is equal to



- (a) $GQ \times FS$
- (b) $2GQ \times FS$
- (c) $3GQ \times FS$
- (d) $4GQ \times FS$
- **18.** In the given figure, *AOB* is a diameter of a circle with centre *O*, The value of tan *A* tan *B*. will be



- (a) 1
- (b) 2
- (c) $\sqrt{3}$
- (d) 3
- 19. If x = a and y = b is the solution of the equations x y = 2 and x + y = 4, then the values of a and b are, respectively
 - $(a) \ 3 and 5$
 - (b) 5 and 3
 - (c) 3 and 1
 - (d) -1 and -3
- **20.** A fair die is thrown once. The probability of getting a composite number less than 5 is
 - (a) $\frac{1}{3}$
 - (b) $\frac{1}{6}$
 - (c) $\frac{2}{3}$
 - (d) 0

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 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)
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- (c) (3, 0) (d) (-2, 0)
- **23.** If $\sin\theta + \cos\theta = \sqrt{3}$, then $\tan\theta + \cot\theta = ?$

(a)	1	(b) 2
(c)	3	(d) 4

- **24.** What do you say about the lines represented by 2x + y = 3 and 4x + 2y = 6?
 - (a) lines are parallel (b) lines are coincident
 - (c) lines are intersecting (d) can't say anything
- **25.** If the square of difference of the zeroes of the quadratic polynomial $x^2 + px + 45$ is equal to 144, then the value of p is

(a)	± 9		(b)	± 12

- (c) ± 15 (d) ± 18
- 26. There are 1000 sealed envelopes in a box. 10 of them contain a cash prize of ₹ 100 each, 100 of them contain a cash prize of ₹ 50 each and 200 of them contain a cash prize of ₹ 10 each and rest do not contain any

cash prize. If they are well-shuffled and an envelope is picked up out, then the probability that is contains no cash prize is

- (a) 0.65 (b) 0.69
- (c) 0.54 (d) 0.57
- **27.** If three different coins are tossed together, then What is the probability of getting two heads?
 - (a) $\frac{3}{8}$ (b) $\frac{1}{4}$
 - (c) $\frac{1}{2}$ (d) $\frac{5}{8}$

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

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

(a)
$$\frac{1}{1-2\cos^2 A}$$
 (b) $\frac{1}{1+2\cos^2 A}$

- (c) $\frac{2}{2\sin^2 A 1}$ (d) $\frac{1}{1 2\sin^2 A}$
- **29.** The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is



- **30.** Two similar triangles ABC and PQR have their areas 25 cm^2 and 49 cm^2 respectively. If QR = 9.8 cm, what is the length of side BC?
 - (a) 2 cm (b) 5 cm
 - (c) 7 cm (d) 4 cm
- **31.** What is the co-ordinates of the point where the line 2x 3y 5 = 0 cuts the x-axis ?
 - (a) $(0, \frac{3}{2})$ (b) $(\frac{3}{2}, 0)$
 - (c) $\left(\frac{5}{2}, 0\right)$ (d) $\left(0, \frac{5}{2}\right)$
- **32.** $\tan^2 30^\circ \sin 30^\circ + \cos 60^\circ \sin^2 90^\circ \tan^2 60^\circ 2 \tan 45^\circ \cos^2 0^\circ \sin 90^\circ$
 - (a) $\frac{2}{3}$ (b) $\frac{1}{3}$
 - (c) $-\frac{2}{3}$ (d) $-\frac{1}{3}$

29. The perim

33. Lina is preparing dinner plates. She has 12 pieces of chicken and 16 rolls. If she wants to make all the plates identical without any food left over, what is the greatest number of plates Lina can prepare ?



(a) 1 plate	(b) 2 plate
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- (c) 3 plate (d) 4 plate
- **34.** Triangle ΔPQR is right angled at Q. $QX \perp PR, XY \perp RQ$ and $XZ \perp PQ$ are drawn. The term XZ^2 is equal to



- **35.** If A(5,2), B(2,-2) and C(-2,t) are the vertices of a right angled triangle with $\angle B = 90^{\circ}$, then the value of t will be
 - (a) 1 (b) 2
 - (c) 3 (d) 4

36. What is the area of minor segment of a circle of radius 14 cm, when its centre angle is 60°. Also What is the area of corresponding major segment? Use $\pi = \frac{22}{7}$.

(a) 598 cm^2 (b) 492 cm^2

(c)
$$693 \text{ cm}^2$$
 (d) 765 cm^2

37. In fig., what is the area of the shaded region? Use $\pi = \frac{22}{7}$.



- **38.** 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
- **39.** In the figure OABC is a quadrant of a circle of radius 7 cm. If OD = 4 cm, what is the area of shaded region?



- (a) 55 cm^2 (b) 24.5 cm^2 (c) 49 cm^2 (d) 35 cm^2
- 40. What are the values of x and y for the following system of linear equations ?

$$2x - y = 2$$
$$x + 3y = 15$$

(c) 5 and 4 (d) 4 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: (41-44)

The centroid is the centre point of the object. It is also defined as the point of intersection of all the three medians. The median is a line that joins the midpoint of a side and the opposite vertex of the triangle. The centroid of the triangle separates the median in the ratio of 2 : 1. It can be found by taking the average of x- coordinate points and y-coordinate points of all the vertices of the triangle.

See the figure given below



Here D, E and F are mid points of sides BC, AC and AB in same order. G is centroid, the centroid divides the median in the ratio 2 : 1 with the larger part towards the vertex. Thus AG:GD = 2:1

On the basis of above information read the question below.

If G is Centroid of $\triangle ABC$ with height h and J is centroid of $\triangle ADE$. Line DE parallel to BC, cuts the $\triangle ABC$ at a height $\frac{h}{4}$ from BC. $HF = \frac{h}{4}$.



- **41.** What is the length of AH ?
 - (a) $\frac{h}{2}$ (b) $\frac{2h}{3}$
 - (c) $\frac{3h}{4}$ (d) $\frac{h}{4}$
- **42.** What is the distance of point A from point G?
 - (a) $\frac{2AF}{3}$ (b) $\frac{3AF}{2}$
 - (c) $\frac{AF}{3}$ (d) $\frac{AF}{2}$
- **43.** What is the distance of point A from point J?
 - (a) $\frac{2AG}{3}$ (b) $\frac{3AG}{4}$
 - (c) $\frac{AG}{3}$ (d) $\frac{AG}{2}$
- **44.** What is the distance GJ ?
 - (a) $\frac{AG}{3}$ (b) $\frac{AG}{4}$
 - (c) $\frac{2AG}{3}$ (d) $\frac{AG}{2}$
- 45. Which of the following statement is false?
 - (a) All isosceles triangles are similar.
 - (b) All quadrilateral are similar.
 - (c) All circles are similar.
 - (d) None of the above

Case Based Questions: (46-49)

The cost to produce bottled spring water is given by C(x) = 16x - 63 where x is the number of thousands of bottles. The total income (revenue) from the sale of these bottles is given by the function $R(x) = -x^2 + 326x - 7463.$



- **46.** Since Profit = Revenue Cost, the profit function would be
 - (a) $-x^2 + 210x 2400$ (b) $-x^2 + 210x 7400$ (c) $-x^2 + 310x - 7400$ (d) $-x^2 - 310x + 7400$
- 47. How many bottles sold will produce the maximum profit?
 - (a) 125 (b) 155
 - (c) 175 (d) 185
- **48.** What is the maximum profit?
 - (a) Rs 14625 (b) Rs 16625
 - (c) Rs 22645 (d) Rs 14685
- **49.** What is the profit when 245 thousand bottles are sold?
 - (a) Rs 8525 (b) Rs 9225
 - (c) Rs 12645 (d) Rs 10685
- **50.** In given figure, the graph of a polynomial p(x) is shown. The number of zeroes of p(x) will be



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Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(c)	Ch-1	8
2	(b)	Ch-2	S-3
3	(d)	Ch-4	9
4	(d)	Ch-4	22
5	(a)	Ch-8	9
6	(b)	Ch-4	32
7	(d)	Ch-6	10
8	(b)	Ch-1	14
9	(d)	Ch-3	9
10	(b)	Ch-5	8
11	(b)	Ch-1	29
12	(c)	Ch-1	S-24
13	(a)	Ch-6	26
14	(a)	Ch-6	39
15	(b)	Ch-7	42
16	(d)	Ch-4	42
17	(a)	Ch-4	53
18	(a)	Ch-6	55
19	(c)	Ch-3	19
			1
20	(b)	Ch-8	20
21	(b)	Ch-1	39
22	(b)	Ch-5	19
23	(a)	Ch-6	69
24	(b)	Ch-3	31
25	(d)	Ch-2	13

SAMPLE PAPER - 23 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
26	(b)	Ch-8	30
27	(a)	Ch-8	41
28	(a)	Ch-6	83
29	(b)	Ch-5	29
30	(c)	Ch-4	64
31	(c)	Ch-5	54
32	(d)	Ch-6	97
33	(d)	Ch-1	56
34	(d)	Ch-4	77
35	(a)	Ch-5	43
36	(a)	Ch-7	51
37	(b)	Ch-7	85
38	(d)	Ch-2	31
39	(b)	Ch-7	95
40	(b)	Ch-3	41
41	(c)	Ch-4	115
42	(a)	Ch-4	116
43	(b)	Ch-4	117
44	(b)	Ch-4	118
45	(a)	Ch-4	4
46	(c)	Ch-2	71
47	(b)	Ch-2	72
48	(b)	Ch-2	73
49	(a)	Ch-2	74
50	(a)	Ch-2	30

* S- = Self Test Question