



INDIAN SCHOOL SOHAR
PERIODIC TEST III (2024-25)
MATHEMATICS (041)

No of printed pages : 6
(SET-A)

CLASS : X
DATE : 03/12/2024

MAX MARKS : 80
TIME : 3 Hours

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION – A Multiple Choice Questions (Each question carries 1 mark)		
1	If $x^2 + \frac{1}{x^2} = 102$, then the value of $x - \frac{1}{x}$ is (a) 8 (b) 10 (c) 12 (d) 13	1
2	A quadratic polynomial, the sum and product of whose zeroes are $-\frac{1}{4}$ and $\frac{1}{4}$ respectively, is (a) $4x^2 + x + 1$ (b) $x^2 - 3x + 2$ (c) $x^2 + 3x - 2$ (d) None of these	1
3	The angles of cyclic quadrilaterals ABCD are: $A = (6x + 10)^\circ$, $B = (5x)^\circ$, $C = (x+y)^\circ$ and $D = (3y-10)^\circ$. The value of x and y is: (a) $x=20^\circ$ and $y = 10^\circ$ (b) $x=20^\circ$ and $y = 30^\circ$ (c) $x=44^\circ$ and $y=15^\circ$ (d) $x=15^\circ$ and $y=15^\circ$	1
4	The nature of roots of quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$ (a) Real & equal (b) real & unequal (c) imaginary (d) real & distinct	1

5	The ratio in which the point $(-3, k)$ divides the line-segment joining the points $(-5, -4)$ and $(-2, 3)$ (a) 1:4 (b) 1:2 (c) 4:1 (d) 2:1	1
6	If $\sin\theta - \cos\theta = 0$, then the value of $\sin^4\theta + \cos^4\theta$ is (a) 1 (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$	1
7	In the given figure, if $AB = 8$ cm and $PE = 3$ cm, then $AE =$ (a) 11 cm (b) 7 cm (c) 5 cm (d) 3 cm	1
8	The distance between the points $A(a\cos\theta + b\sin\theta, 0)$ and $B(0, a\sin\theta - b\cos\theta)$ is _____. (a) $\sqrt{a^2 + b^2}$ (b) $\sqrt{a^2 - b^2}$ (c) 1 (d) 0	1
9	In the given figure, APB is a tangent to a circle with centre O at point P . If angle $QPB = 50^\circ$, then the measure of the angle POQ is _____. (a) 120° (b) 100° (c) 140° (d) 150°	1
10	If a right circular cone of vertical height 12 cm has a volume of 616 cm^3 , then the radius of its base is (a) 6 cm (b) 7 cm (c) 8 cm (d) 9 cm	1
11	If the median of the data $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$ is α then the median of the data x_3, x_4, x_5, x_6 is (a) α (b) 10 (c) β (d) 4	1
12	If $3\sec\theta - 5 = 0$, then $\cot\theta$ is equal to (a) $\frac{5}{3}$ (b) $\frac{4}{5}$ (c) $\frac{3}{4}$ (d) $\frac{3}{5}$	1
13	If a, b, c, d, e are in A.P., then the value of $a - 4b + 6c - 4d + e$ is (a) 0 (b) 1 (c) -1. (d) 2	1
14	Volume of the cubes is in the ratio of 8:125. The ratio of their surface areas is (a) 8:125 (b) 2:5 (c) 4:25 (d) 16:25	1
15	Construction of a cumulative frequency table is useful in determining the (a) mean (b) median (c) mode (d) all the above three measures	1
16	Which of the following can't be the probability of an event? (a) $\frac{2}{3}$ (b) 0.7 (c) 15 % (d) $\frac{4}{3}$	1
17	The probability that a non leap year selected at random will contain 53 Sundays is (a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{5}{7}$	1
18	The perimeter of a circle is equal to that of a square, then the ratios of their areas is: (a) 14:11 (b) 22:7 (c) 7:22 (d) 11:14	1

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
 (c) (A) is true but (R) is false.
 (d) (A) is false but (R) is true.

19	Assertion (A) : HCF of 105 and 225 is 15 and LCM(105,225)=225 x K, then the value of K is 7. Reason(R) : If any two positive number a and b, HCF (a,b) x LCM(a,b) = a x b	1
20	Assertion (A) : The length of the minute hand of a clock is 7 cm. Then the area swept by minute hand in 5 minute is $\frac{53}{6} \text{ cm}^2$. Reason(R) : The length of an arc of a sector of angle and radius r is given by $l = \frac{\theta}{360^\circ} \times 2\pi r$.	1

SECTION B

(This section comprises of very short answer type questions (VSA) of 2 marks each)

21	If the point P(x,y) is equidistant from the points A(5,1) and B(-1,5), Prove that $3x=2y$.	2
22	If $\sin \theta = \frac{a-b}{a+b}$, then find $\cot \theta$?	2
23	Given that $(1-x)(1+x+x^2+x^3+x^4) = 31/32$ and x is a rational number. Then find the value of $(1+x+x^2+x^3+x^4)$ OR If $P = 2 \times 4 \times 6 \times \dots \times 20$ and $Q = 1 \times 3 \times 5 \times \dots \times 19$, what is the HCF of P and Q?	2
24	If A(-2,1), B(α ,0), C(4, β) and D(1,2) are the vertices of a parallelogram ABCD. Find the values of α and β . Hence find the length of its sides.	2
25	Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is less than 9. OR Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3, respectively. They are thrown and the sum of the numbers on them is noted. Find the probability of getting sum on them is 5.	2

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

26	If $\cos^2 \theta - \sin^2 \theta = \tan^2 \phi$, prove that $\cos \phi = \frac{1}{\sqrt{2}} \cos \theta$.	3
27	Show that $5 + \sqrt{3}$ is irrational.	3
28	A chord of a circle of radius 20 cm subtends an angle of 90° at the centre. Find the area of the corresponding major segment of the circle. (Use $\pi = 3.14$). OR Find the areas of a minor segment and major sector of a circle of radius 21 cm and angle at the centre is 120° .	3
29	A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed?	3
30	Football is a family of team sports that involve, to varying degrees, kicking a ball to score a goal. In a football match, the ball's bounce resembles the movement of a parabola. If α and β are the zeros of the polynomial $p(x) = 2x^2 + 5x + k$ such that $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$ then find the value of k.	3

31	Find the length of UT from below figure.	3
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OR

Write the statement of Thales’s theorem and prove it.

SECTION D		
(This section comprises of long answer type questions (LA) of 5 marks each)		

32	ΔABC , $AB = 8$ cm, $BC = 6$ cm, $CA = 4$ cm. With the vertices of triangle as centre, three circles are described, each touching the other two externally. Find the radii of each circle	5																																
33	The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18. Find the missing frequency f. <table><tr><td>Daily pocket allowance (in Rs.)</td><td>11-13</td><td>13-15</td><td>15-17</td><td>17-19</td><td>19-21</td><td>21-23</td><td>23-25</td></tr><tr><td>Number of children</td><td>7</td><td>6</td><td>9</td><td>13</td><td>f</td><td>5</td><td>4</td></tr></table> OR The distribution below gives the weights of 30 students of a class. Find the mean and median weight of the students. <table><tr><td>Weight(in kg)</td><td>40-45</td><td>45-50</td><td>50-55</td><td>55-60</td><td>60-65</td><td>65-70</td><td>70-75</td></tr><tr><td>No of Students</td><td>2</td><td>3</td><td>8</td><td>6</td><td>6</td><td>3</td><td>2</td></tr></table>	Daily pocket allowance (in Rs.)	11-13	13-15	15-17	17-19	19-21	21-23	23-25	Number of children	7	6	9	13	f	5	4	Weight(in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	No of Students	2	3	8	6	6	3	2	5
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No of Students	2	3	8	6	6	3	2																											
34	The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number. OR Check graphically whether the pair of equations $x + 3y = 6$ and $2x - 3y = 12$ is consistent. If consistent then solve them graphically.	5																																
35	From the top of a 7 m high watch tower, the angle of elevation of the top of a mobile network tower is 60° and the angle of depression of its foot is 45° . Determine the height of the mobile network tower.	5																																

SECTION E		
[This section comprises of 3 case- study/passage based questions of 4 marks each with sub parts. These case study questions have three sub parts (i), (ii), (iii) of marks 1,1,2 respectively.]		

36	Mutual Fund : A mutual fund is a type of investment vehicle that pools money from multiple investors to invest in securities like stocks, bonds or other securities. Mutual funds are operated by professional money managers, who allocate the fund’s assets and attempt to produce capital gains or income for the fund’s investors.	4
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Net Asset Value (NAV) represents a fund's per share market value. It is the price at which the investors buy fund shares from a fund company and sell them to a fund company. The following table shows the Net Asset Value (NAV) per unit of mutual fund of ICICI mutual funds.

NAV (INR)	0-5	5-10	10-15	15-20	20-25
Number of mutual funds	13	16	22	18	11

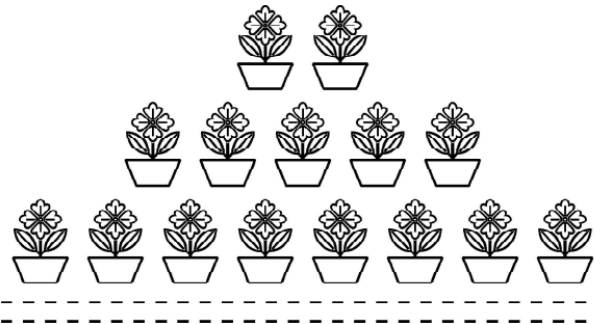
Based on the above information, answer the following questions.

- (i) What is the upper limit of modal class of the data? [1 mark]
 (ii) What is the median class of the data? [1 mark]
 (iii)(a) What is the mode NAV of mutual funds? [2 marks]

OR

- (iii)(b) What is the median NAV of mutual funds? [2 marks]

- 37 Aahana being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that number of pots in the first row is 2, second row is 5, third row is 8 and so on.



Based on the above information, answer the following questions.

- (i) Find the number of pots placed in the 10th row. [1mark]
 (ii) Find the difference in the number of pots placed in 5th row and 2nd row. [1 mark]
 (iii)(a) If Aahana wants to place 100 pots in total, then find the total number of rows formed in the arrangement. [2 marks]

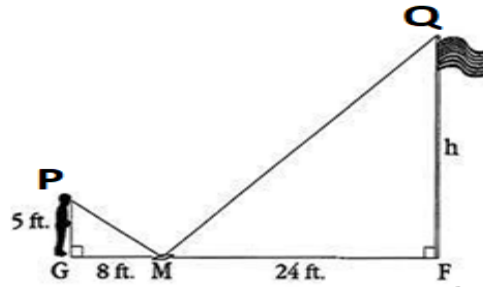
OR

- (iii)(b) If Aahana has sufficient space for 12 rows, then how many total numbers of pots are placed by her with the same arrangement? [2 marks]

38

There is a mirror M situated on the ground. Roshan is watching the reflection of the flag in the mirror. This condition is shown with the help of two triangles in the adjoining figure. If point P represents head of Roshan and point Q represents top of the pole (in which the flag is flying). We know with the help of law of reflection, $\angle PMG = \angle QMF$. Answer the questions given below.

4



(i) By which criterion of similarity are $\triangle PGM$ and $\triangle QFM$ similar?

[1 mark]

(ii) Find the height of the pole (h).

[1 mark]

(iii)(a) What is the ratio between the corresponding sides of these two similar triangles?

[2 marks]

OR

(iii)(b) What is the ratio between the areas of these two similar triangles?

[2 marks]

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