Suraj Bhan DAV Public School , Vasant Vihar

Class X Pre Board Examination

Mathematics Standard (Session 2024-2025)
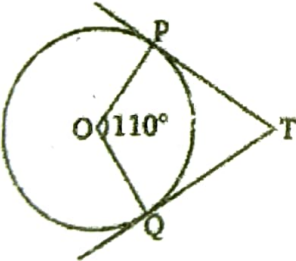
Time : 3 hours   **Max Marks : 80**

General Instructions:

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 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided and Internal choice has been provided in all the 2 marks questions of Section E.

Q.No.	Section A	Marks
	Section A consists of 20 questions of 1 mark each.	
1.	The lines representing the given pair of linear equations are non-intersecting. Which of the following statements is true? (a) $\dfrac{a1}{a2} = \dfrac{b1}{b2} = \dfrac{c1}{c2}$ (b) $\dfrac{a1}{a2} = \dfrac{b1}{b2} \neq \dfrac{c1}{c2}$ (c) $\dfrac{a1}{a2} \neq \dfrac{b1}{b2} = \dfrac{c1}{c2}$ (d) $\dfrac{a1}{a2} \neq \dfrac{b1}{b2} \neq \dfrac{c1}{c2}$ $a_1x + b_1y + c_1 = 0$ $a_2x + b_2y + c_2 = 0$	1

2.	One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 7 is _____. (a) $\frac{1}{7}$ (b) $\frac{1}{8}$ (c) $\frac{1}{9}$ (d) $\frac{1}{10}$	1
3.	Area of a sector of angle p (in degrees) of a circle with radius R is _____. (a) $\frac{p}{180} \times 2\pi R$ (b) $\frac{p}{180} \times \pi R^2$ (c) $\frac{p}{360} \times 2\pi R$ (d) $\frac{p}{720} \times 2\pi R^2$	1
4.	Given that $\sin\theta = \frac{a}{b}$ then $\cos\theta$ is _____. (a) $\frac{b}{\sqrt{b^2-a^2}}$ (b) $\frac{b}{a}$ (c) $\frac{\sqrt{b^2-a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2-a^2}}$	1
5.	Find the sum 1 + 2 + 3 +.......+ 1000 = _____ (a) 500500 (b) 5050 (c) 50500 (d) 5500	1
6.	In figure, if TP and TQ are the two tangents to a circle with center O so that $\angle POQ = 110°$, then $\angle PTQ$ is equal to (a) 60° (b) 70° (c) 80° (d) 90° 	1
7.	If a pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground , then the Sun's Elevation is _____. (a) 60° (b)45° (c)30° (d) 90°	1
8.	Savita and Hamida are friends. What is the probability that both will have different birthdays ? (Ignoring a leap year) (a) $\frac{1}{365}$ (b) $\frac{2}{365}$ (c) $\frac{3}{365}$ (d) $\frac{364}{365}$	1
9.	The nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$ is: (a) No real roots (b) two equal real roots (c) two distinct real roots (d) More than two real roots	1

10.	One card is drawn from a well-shuffled deck of 52 cards. The probability that the card will not be an ace is _____ . (a) $\frac{1}{13}$ (b) $\frac{10}{13}$ (c) $\frac{11}{13}$ (d) $\frac{12}{13}$	1
11.	There is a square board of side '2a' units circumscribing a red circle. Jayadev is asked to keep a dot on the above said board. The probability that he keeps the dot on the shaded region is. (a) $\frac{\pi}{4}$ (b) $\frac{4-\pi}{4}$ (c) $\frac{\pi-4}{4}$ (d) $\frac{4}{\pi}$	1
12.	In the given figure, DE ∥ BC, AE = a units, EC = b units, DE = x units and BC = y units. Which of the following is true? (a) $x=\frac{a+b}{ay}$ (b) $y=\frac{ax}{a+b}$ (c) $x=\frac{ay}{a+b}$ (d) $\frac{x}{y}=\frac{a}{b}$	1
13.	If the difference of Mode and Median of a data is 24, then the difference of median and mean is (a) 8 (b) 12 (c) 24 (d) 36	Mode — Median AA — meo 1
14.	A father is three times as old as his son. In 12 years time , he will be twice as old as his son . The present age of the father is _____ years. a. 48 years b. 11 years c. 12 years d. 36 years	1

3

3 Med : Mod + 2 mean

3 Med − Mod = 24

3(24)

92

$\frac{4}{2\sqrt{92}}$
8

Q.13
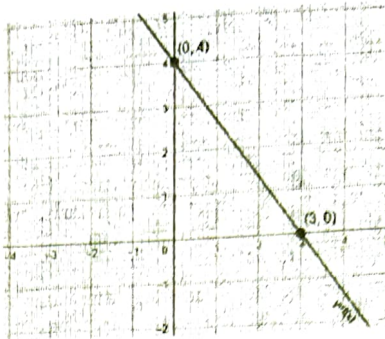
Mode − Median = m
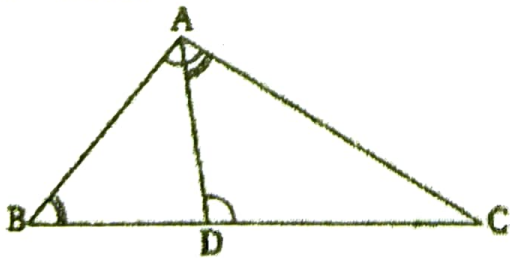
then

median − Mean = $\frac{m}{2}$
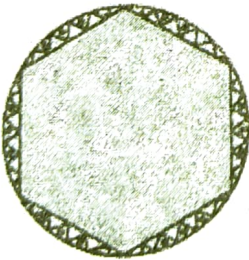
		1
15.	The given linear polynomial $y = f(x)$ has (a) 2 zeros (b) 1 zero and the zero is '3' (c) 1 zero and the zero is '4' (d) No zero	

16.	What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes ? a. 16 m / min b. 17 m /min c. 18 m/ min d. 19m/min	1
17.	Which of the following is a quadratic polynomial with zeroes $\frac{5}{3}$ and 0 ? (A) $3x(3x-5)$ (B) $3x(x-5)$ (C) $x^2 - \frac{5}{3}$ (D) $\frac{5}{3}x^2$	1
18.	In the given figure, O is the centre of the circle and PQ is the chord. If the tangent PR at P makes an angle of 50° with PQ, then the measure of $\angle POQ$ is : (a) 50° (b) 40° (c) 100° (d) 130°	1

(Assertion and Reason)Directions : Choose the correct option

a) both assertion and reason are correct and reason is the correct explanation of assertion.

b) both assertion and reason are correct but reason is not the correct explanation of assertion.

c) assertion is true but reason is false

d) Reason is true but Assertion is false.

4

19.	Assertion (A) : $-5, \frac{-5}{2}, 0, \frac{5}{2}$ is in AP. Reason (R) : The terms of an AP cannot have both positive and negative rational numbers.	1
20.	Assertion(A): The equation $9x^2 + 3kx + 4 = 0$ has equal roots for k = -4, 4. Reason (R): If discriminant 'D' of a quadratic equation is equal to zero then the roots of the equation are real and equal.	1

Section B

Section B consists of 5 questions of 2 marks each.

21.	Evaluate : $\dfrac{2sin^2\ 60° - tan^2\ 30°}{sec^2\ 45°}$	2
22.	Find the H.C.F and L.C.M of 480 and 720 using the Prime factorisation method. **OR** The H.C.F of 85 and 238 is expressible in the form 85m -238. Find the value of m.	2
23.	If A and B are (-2,-2) and (2,-4) respectively, find the coordinates of P such that AP = $\frac{3}{7}$ AB and P lies on the line segment AB. **OR** Find the values of y for which the distance between the points P(2,-3) and Q (10,y) is 10 units.	2
24.	D is a point on the side BC of a triangle ABC, such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.CD$. 	2

25.	The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm , find the other two sides.	2
	Section C	
	Section C consists of 6 questions of 3 mark each.	
26.	Given that $\sqrt{5}$ is rational number , Prove that $3 + 2\sqrt{5}$ is an irrational number.	3
27.	If α and β are zeroes of Quadratic polynomial $5x^2 + 5x + 1$, find the value of - 1. $\alpha^2 + \beta^2$ 2. $\alpha^{-1} + \beta^{-1}$	3
28.	The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2 , find the number. How many such numbers are there ? **OR** A lending library has a fixed charges for first three days and an additional charge for each day thereafter. Saritha paid ₹ 27 for a book kept for seven days , while Susy paid ₹ 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.	3
29.	A round table cover has six equal designs as shown in the figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of ₹ 0.35 per cm². (Use $\sqrt{3}$= 1.7) 	3
30.	Prove that $\dfrac{cosA - sinA + 1}{cosA + sinA - 1} = $ cosec A + cot A , using the identity $cosec^2 A = 1 + cot^2 A$. **OR**	3

6

If $\cot \theta = \frac{7}{8}$ evaluate

(i) $\dfrac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$

(ii) $\cot^2 \theta$

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31. Find the ratio in which line segment joining A (1, -5) and B (-4, 5) is divided by the x-axis. Also, find the coordinates of the point of division. | 3

Section D

Section D consists of 4 questions of 5 mark each.

32. Find the mean and median of the following data. | 5

Class	85-90	90-95	95-100	100-105	105-110	110-115
frequency	15	22	20	18	20	25

OR

The monthly expenditure on milk in 200 families of a Housing Society is given below.
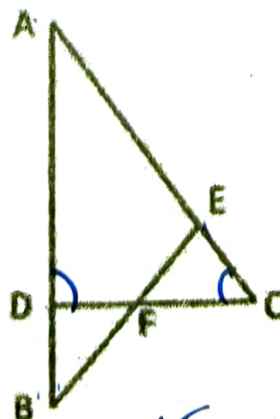Find the value of x and also find the mean expenditure.

Monthly Expenditure (in Rs.)	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000
Number of families	24	40	33	x	30	22	16	7

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33. (a) State and prove Basic Proportionality theorem. | 5

(b) In the given figure $\angle CEF = \angle CFE$. F is the midpoint of DC. Prove that $\dfrac{AB}{BD} = \dfrac{AE}{FD}$.

34.	A gulab jamun contains sugar syrup up to about 30 % of its volume. Find approximately how much syrup would be found in 45 gulab jamuns , each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm. *vol of 1 gulab jamun* $= \frac{1}{3} \pi r^2 h$ **OR** A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and the slant height of the top is 2.8m , find the area of the canvas used for making the tent. Also find the cost of the canvas of the tent at the rate ₹ 500 per m^2 . (Note that the base of the tent will not be covered with canvas)	5
35.	Solve the following pair of linear equations graphically: x + 3y = 6 2x – 3y = 12 Also find the area of the triangle formed by the lines representing the given equations with y-axis.	5
	Section E	
	Section E are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.	
36.	Manpreet Kaur is the national record holder for women in the shot-put discipline. Her throw of 18.86m at the Asian Grand Prix in 2017 is the maximum distance for an Indian female athlete. Keeping her as a role model, Sanjitha is determined to earn gold in Olympics one day. Initially her throw reached 7.56m only. Being an athlete in school, she regularly practiced both in the mornings and in the evenings and was able to improve the distance by 9cm every week. During the special camp for 15 days, she started with 40 throws and every day kept increasing the number of throws by 12 to achieve this remarkable progress.	

|	Answer the following questions.	
	(i) How many throws Sanjitha practiced on the 11th day of the camp?	1
	(ii) What would be Sanjitha's throw distance at the end of 6 weeks?	2
	OR	1
	(ii) When will she be able to achieve a throw of 11.16 m?	
	(iii) How many throws did she do during the entire camp of 15 days?	
37.	We all have seen the airplanes flying in the sky but might have not thought of how they actually reach the correct destination. Air Traffic Control (ATC) is a service provided by ground-based air traffic controllers who direct aircraft on the ground and through a given section of controlled airspace, and can provide advisory services to aircraft in non-controlled airspace. Actually, all this air traffic is managed and regulated by using various concepts based on coordinate geometry and trigonometry.	
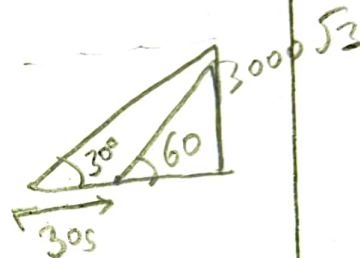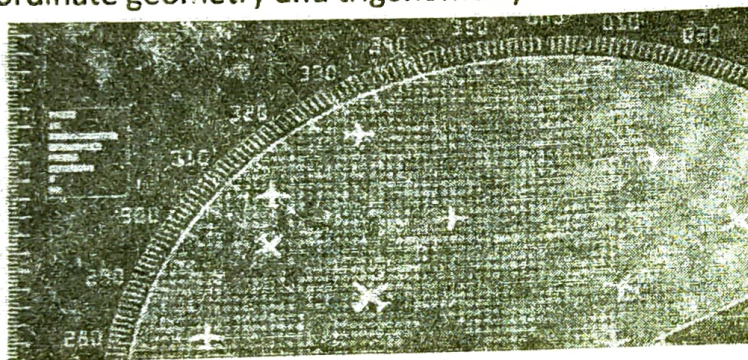
At a given instance, ATC finds that the angle of elevation of an airplane from a point on the ground is 60°. After a flight of 30 seconds, it is observed that the angle of elevation changes to 30°. The height of the plane remains constantly as 3000√3 m.

Use the above information to answer the questions that follow-
(i) Draw a neat labeled figure to show the above situation diagrammatically.   **1**

(ii) What is the distance traveled by the plane in 30 seconds?

OR

Keeping the height constant, during the above flight, it was observed that after 15($\sqrt{3}$ -1) seconds, the angle of elevation changed to 45°. How much is the distance traveled in that duration.   **2**

(iii) What is the speed of the plane in km/hr.   **1**

| 38. | Rohan is fond of collecting balls of different colors. He has a total of 25 balls in his basket out of which five balls are red in color and eight are white . Out of the remaining balls , some are green in color and the rest are pink. Based on the above information , solve the following questions. | |

(i) If the probability of drawing a pink ball is twice the probability of drawing a green ball then find the number of pink balls. | 1

(ii) Find the probability of drawing a ball of color other than green color. | 1

(iii) Find the probability of drawing either a green or white ball.

OR

| 2

(iii) What is the probability that drawn ball is neither a pink nor a white ball ?