Stage III

Sample QUESTION PAPER

unsolved

MATHEMATICS

A Highly Simulated Practice Question Papers for **CBSE Class X**
Term I *Examination* (SA I)

Time : 3 hrs **Max. Marks :** 90

General Instructions

1. All questions are compulsory.
2. Draw neat labelled diagram whenever necessary to explain your answer.
3. Question Numbers 1-8 are multiple choice questions, carrying 1 mark each.
4. Question Numbers 9-14 are short answer type questions, carrying 2 marks each.
5. Question Numbers 15-24 are short answer type questions, carrying 3 marks each.
6. Question Numbers 25-34 are long answer type questions, carrying 4 marks each.

Section A

Que 1. π is

(a) an integer
(b) a rational number
(c) an irrational number
(d) None of the above

Que 2. The system of equations $2x+3y=5$ and $4x+6y=15$

(a) is inconsistent
(b) have a unique solution
(c) have infinitely many solutions
(d) None of the above

Que 3. If $\tan A=\frac{4}{3}$ and A is acute, then $\sin A$ is equal to

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$
(c) $\frac{5}{3}$ (d) $\frac{5}{4}$

Que 4. $\sin^2\theta+\cos^2\theta$ is equal to

(a) 0 (b) $\frac{1}{2}$
(c) 1 (d) -1

Que 5. The value of $\sin^2 39° + \sin^2 51°$ is equal to

(a) 1 (b) 0
(c) $2\sin^2 39°$ (d) $2\cos^2 51°$

Que 6. If $b\tan\theta = a$, then $\dfrac{b\sin\theta - a\cos\theta}{b\sin\theta + a\cos\theta}$ is equal to

(a) $\dfrac{a}{b}$ (b) $\dfrac{b}{a}$ (c) 1 (d) 0

Que 7. The graphical representation of a cumulative frequency distribution is called

(a) bar graph (b) histogram
(c) frequency polygon (d) an ogive

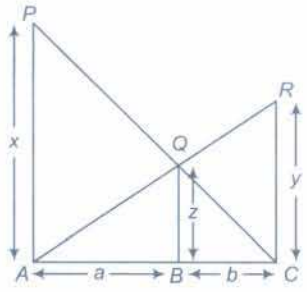
Que 8. $\cot(90° - \theta)$ is equal to

(a) $\cot\theta$ (b) $-\cot\theta$
(c) $\tan\theta$ (d) $-\tan\theta$

Section B

Que 9. Express $0.3\bar{6}$ as a fraction in simplest form.

Que 10. In the given figure, PA, QB and RC each is perpendicular to AC such that $PA = x$, $RC = y$, $QB = z$, $AB = a$ and $BC = b$. Prove that $\dfrac{1}{x} + \dfrac{1}{y} = \dfrac{1}{z}$.



Que 11. In ΔABC, right angled at A, if $\cot B = 1$, find the value of

(i) $\cos B\cos C + \sin B\sin C$ and
(ii) $\sin B\cos C - \cos B\sin C$.

Que 12. If A, B and C are interior angles of a ΔABC, then show that

$$\sin\left(\frac{B + C}{2}\right) = \cos\frac{A}{2}.$$

Que 13. Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$ or $(3m + 1)$ for some integer m.

Que 14. Write the following distribution as more than type cumulative frequency distribution.

Class interval	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	2	6	8	14	15	5

Section C

Que 15. Ram and Sita drive around a circular sport field. Ram takes 16 min to take one round, while Sita completes the round in 20 min. If both start at the same point, at the same time and go in the same direction.

(i) After how much time will they meet at the starting point?
(ii) Write the name of the chapter.
(iii) Which mathematical concept is used to solve the question?
(iv) What is the role of Ram and sita in this question?

Que 16. Prove that $\sqrt{\dfrac{1 + \cos A}{1 - \sin A}} = \operatorname{cosec} A - \cot A$.

Que 17. If α and β are the two zeroes of the polynomial $21y^2 - y - 2$, find a quadratic polynomial whose zeroes are 2α and 2β.

Que 18. Prove that

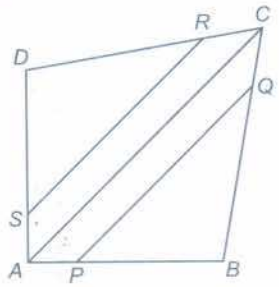
$$\frac{\cos(90° - \theta)}{1 + \sin(90° - \theta)} + \frac{1 + \sin(90° - \theta)}{\cos(90° - \theta)} = 2\operatorname{cosec}\theta.$$

OR

Show that $\dfrac{\tan\theta}{1 - \cot\theta} + \dfrac{\cot\theta}{1 - \tan\theta} = 1 + \sec\theta\operatorname{cosec}\theta$.

Que 19. The sum of two-digit numbers and the number obtained by reversing the digit is 66. If the digits of a number differ by 2, find the number.

Que 20. In the given figure $ABCD$ is a quadrilateral P, Q, R and S are the points of trisection of the sides AB, BC, CD and DA, respectively. Prove that $PQRS$ is a parallelogram.



Que 21. Find the mean of the given frequency distribution table.

Class interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	11	15	20	30	14	10

Que 22. Verify that the numbers $\frac{1}{2}, 1, -2$ are the zeroes of cubic polynomial $2x^3+x^2-5x+2$. Also, verify the relationship between the zeroes and the coefficients.

Que 23. If ABC is an equilateral triangle of side $2a$, then prove that altitude $AD = a\sqrt{3}$.

Que 24. Find the median of the following frequency distribution.

Class interval	0-20	20-40	40-60	60-80	80-100
Frequency	20	16	28	20	5

Section D

Que 25. If the polynomial $f(x)=3x^4+3x^3-11x^2-5x+10$ is completely divisible by $3x^2-5$, find all its zeroes.

Que 26. Draw the graph of $5x-y=7$ and $x-y+1=0$. Also, find the coordinates of the points where these lines intersect the y-axis.

Que 27. If $a\cos\theta - b\sin\theta = c$, prove that $(a\sin\theta + b\cos\theta) = \pm\sqrt{a^2+b^2-c^2}$.

Que 28. In an equilateral ΔABC, D is a point on side BC such that $BD=\frac{1}{3}BC$. Prove that $9AD^2=7AB^2$.

Que 29. ΔABC is a right angled triangle in which $\angle C=90°$ and $CD\perp AB$. If $BC=a$, $CA=b$, $AB=c$ and $CD=p$, then prove that

(i) $cp=ab$ (ii) $\frac{1}{p^2}=\frac{1}{a^2}+\frac{1}{b^2}$

Que 30. Find the mean of each of the following frequency distribution using step deviation method.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	12	18	27	20	17	6

Que 31. Without using trigonometric tables evaluate the following

(i) $\frac{\text{cosec}^2(90°-\theta)-\tan^2\theta}{(\cos^2 48°+\cos^2 42°)} - \frac{\tan^2 30°\sec^2 52°\sin^2 38°}{(\text{cosec}^2 70°-\tan^2 20°)}$

(ii) $\frac{\cot(90°-\theta)\cdot\sin(90°-\theta)}{\sin\theta} + \frac{\cot 40°}{\tan 50°} - (\cos^2 20°+\cos^2 70°)$

Que 32. A sailor goes 8 km downstream in 40 min and return in 1 h. Determine the speed of the sailor in still water and the speed of the current.

Que 33. Draw the more than cumulative frequency curve for the following. Also, find the median from the graph.

Weight (kg)	40-44	44-48	48-52	52-56	56-60	60-64	64-68
Number of students	7	12	33	47	20	11	5

Que 34. Using Euclid's division algorithm, show that the square of any positive integer is either of the form $3q$ or $3q+1$ for some integer q.

Answers

1. (*b*) **2.** (*a*) **3.** (*b*) **4.** (*c*) **5.** (*a*) **6.** (d)

7. (*a*) **8.** (*c*) **9.** $\frac{11}{30}$

11. (i) 1 (ii) 0

14.

More than 50	50
More than 55	48
More than 60	42
More than 65	34
More than 70	20
More than 75	5

15. (i) 80 (ii) Real number

(iii) Euclid's division lemma

(iv) Runner (both)

17. $21x^2 - 2x - 8$ **19.** 42 or 24 **20.** 40.1

24. 44.29 **25.** $\sqrt{\frac{5}{3}}, -\sqrt{\frac{5}{3}}, -2$ and 1

26. (0, −7), (0, 1) **30.** 28 **31.** (i) $\frac{2}{3}$ (ii) 1

32. Speed of sailor = 10 km/h

Speed of current = 2 km/h

33. Median = 53