

APEEJAY SCHOOL,PITAMPURA
CLASS- X
SUBJECT MATHEMATICS
SA1

M.M.90

TIME: 3HRS

General Instructions :

- All questions are compulsory.
- The question paper consists of 31 questions divided into four sections A, B, C and D. Section A contains 4 questions of 1 mark each, Section B is of 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D is of 11 questions of 4 marks each.
- There is no overall choice.
- In question on construction, the drawing should be neat and exactly as per the given measurements.

SECTION A

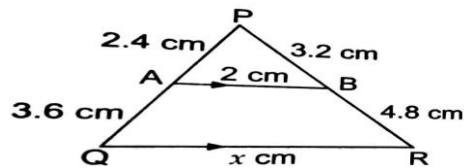
1. The mean of 20 numbers is 15. If each number is multiplied by 7, then the new mean is:

- (a) $\frac{15}{7}$ (b) 75 (c) 105 (d) 22

2. If $\sec A = \operatorname{cosec} B$, the value of $A + B$

- (a) 30° (b) 60° (c) 90° (d) 180°

3. In the given figure ,the value of x(in cm) is



- (a) 4 (b) 5 (c) 6 (d) 8
4. A pair of linear equations , having unique solution intersect at
- (a) 1point (b) 2points (c) 3points (d) do not intersect

SECTION B

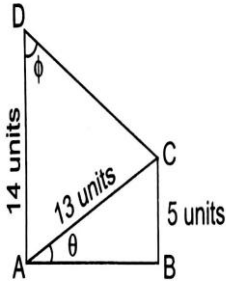
5. Prove that $2\sqrt{3}$ is irrational.

OR

Prove that $(2+\sqrt{3})$ is irrational

6. The areas of two similar triangles $\triangle ABC$ and $\triangle DEF$ are 64 cm^2 and 121 cm^2 . If $EF = 13.2 \text{ cm}$, then find the value of BC .

7. Using the measurements given in the figure, find $\cos \theta$, where $\angle B$ is 90°



8. If A , B , and C are interior angles of a triangle ABC , then show that $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

9. Find the mode of the following distribution

34,37,39,47,34,67,49,34,69,30,56 and 34.

10. If the mean of certain data is 26 and median is 27 then what is mode?

SECTION C

11. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$ where q is positive integer.

12. Use Euclid's division algorithm and find the H.C.F. of 867 and 255.

13. Given that $\text{HCF}(306, 657) = 9$, find $\text{LCM}(306, 657)$.

14. If α and β are the zeroes of the polynomial $f(x) = 2x^2 - 5x + 7$, find a polynomial whose zeroes are $1/\alpha$ and $1/\beta$.

OR

If α and β are the zeroes of the polynomial $f(x) = 7x^2 - 5x + 2$, find the value of $\alpha^2 + \beta^2$

15. The system of linear equations $2x + 5y = k$, $kx + 15y = 18$ has infinitely many solutions, find the value of k .

16. $ABCD$ is a trapezium in which AB is parallel to DC and its diagonals intersect each other at O . Show that $AO/BO = CO/DO$.

17. Prove that ratio of the areas of two similar triangles is equal to the ratio of the square of their corresponding sides.

18. If $\text{cosec} \theta = 2x$ and $y \cot \theta = 2$, then find the value of $4(x^2 - 1/y^2)$.

19. Find the value of $\sin 30^\circ$, geometrically.

20. Prove: $\tan^2 A - \tan^2 B = \frac{\cos^2 B - \cos^2 A}{\cos^2 A \cos^2 B}$

OR

Prove:- $(\sin \theta + \text{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$

SECTION D

21. Find the zeroes of the polynomial $p(x)=2x^4+7x^3-19x^2-14x+30$, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

22. Solve for x and y : $47x + 31y = 63$; and $31x + 47y = 15$

23. 2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can together finish an embroidery work in 3 days. Find the time taken by 1 woman alone to finish the work, and also that taken by 1 man alone. What value is depicted here .

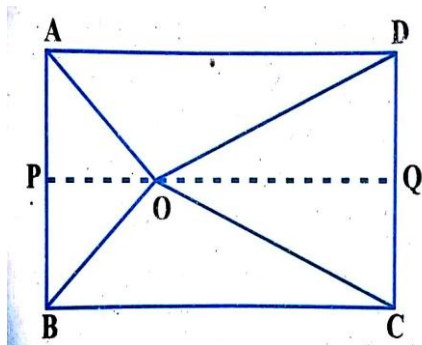
24. Solve graphically:

$$2x - y - 4 = 0$$

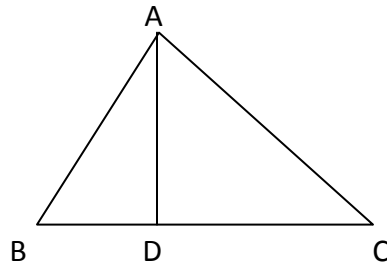
$$x + y + 1 = 0$$

Also find the points where these lines meet y-axis

25. O is any point inside the rectangle ABCD. Prove that $OB^2 + OD^2 = OA^2 + OC^2$



26. In the following fig AD is perpendicular to BC and $BD = \frac{1}{3}CD$. Prove that $2CA^2 = 2AB^2 + BC^2$



OR

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

27. Find the value of :

$$\frac{\sec \theta \operatorname{cosec} (90^\circ - \theta) - \tan \theta \cot (90^\circ - \theta) + \sin^2 55^\circ + \sin^2 35^\circ}{\tan 10^\circ \tan 20^\circ \tan 30^\circ \tan 70^\circ \tan 80^\circ}$$

OR

Find the value of $\operatorname{cosec}^2 60^\circ \sec^2 30^\circ \cos 0^\circ \sin 45^\circ \cot^2 60^\circ \tan^2 60^\circ$

28. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$

29. The median for the following distribution is 35. Find the value of x and y.

CI	0-10	10-20	20-30	30-40	40-50	50-60	60-70	
F	10	20	x	40	y	25	15	= 170

30. The following table shows the marks of 100 students in an examination. Find the mean marks obtained by a student.

<u>Marks</u>	<u>No. of students</u>
0-10	15
10-20	20
20-30	35
30-40	20
40-50	10

31. During the medical checkup of 35 students of a class their heights were recorded as follows-

<u>Weight (in kg)</u>	<u>Number of students</u>
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type ogive and obtain the median from the graph.