CLASS-X SA-1

MATHEMATICS

Time : **3 to 3½** hours   Maximum Marks : **80**
समय : **3 से 3½** घण्टे   अधिकतम अंक : **80**

Total No. of Pages : **13**
कुल पृष्ठों की संख्या : **13**

General Instructions :

1.   **All** questions are **compulsory**.

2.   The question paper consists of **34** questions divided into **four** sections **A, B, C** and **D**. **Section - A** comprises of **10** questions of **1 mark** each, **Section - B** comprises of **8** questions of **2 marks** each, **Section - C** comprises of **10** questions of **3 marks** each and **Section - D** comprises of **6** questions of **4 marks** each.

3.   Question numbers **1** to **10** in **Section - A** are multiple choice questions where you are to select **one correct** option out of the given four.

4.   There is no overall choice. However, internal choice has been provided in **1** question of **two marks**, **3** questions of **three marks** each and **2** questions of **four marks** each. You have to attempt only one of the alternatives in all such questions.

5.   Use of calculator is **not** permitted.

6.   An additional **15** minutes time has been allotted to read this question paper only.

SECTION - A

Question numbers 1 to 10 carry one mark each :

1. If $\tan \theta = \cot \theta$ then the value of $\sec \theta$ is :

(A) 2   (B) 1   (C) $\frac{2}{\sqrt{3}}$ (D) $\sqrt{2}$

2. In Fig. 1, $\triangle ABC$ in right angled at B and $\cot A = \frac{3}{4}$. If AC = 10 cm the length of AB is
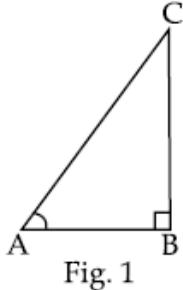

Fig. 1

(A) 3cm   (B) 4cm   (C) 6cm   (D) 8cm

3. The decimal expansion of $\frac{7}{125}$ will terminate after how many places of decimal

(A) 1   (B) 2   (C) 3   (D) 4

4. The pair of linear equations $5x + 4y = 20$ and $10x + 8y = 16$ have

(A) No solution   (B) Many solutions   (C) Two solutions   (D) One solution

5. If $\sec A = \operatorname{cosec} B = \frac{5}{3}$ then $A + B$ is equal to

(A) Zero   (B) 90°   (C) < 90°   (D) > 90°

6. For a given data with 35 observations the 'less than ogive' and 'more than ogive' intersect at (28.5, 30). The median of the data is :

(A) 28.5   (B) 30   (C) 1.5   (D) 35

7. If $\sin 3\theta = \cos (\theta - 26°)$ where 3θ and $(0 - 26°)$ are acute angles, then value of θ is :

(A) $30°$ (B) $29°$ (C) $27°$ (D) $26°$

8. According to Euclid's division algorithm using Euclid's division lemma for any two positive integers a and b with a > b enables us to find :

(A) HCF   (B) LCM

(C) Decimal expansion   (D) Probability

9. In figure 2, the graph of a polynomial p (x) is shown. The number of zeroes of p (x) is :
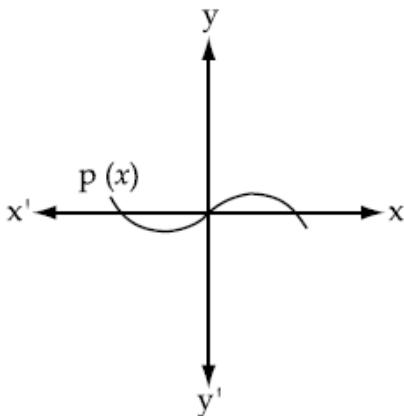
Figure 2

(A) 1   (B) 2   (C) 3   (D) 4

10. In figure 3, if DE ∥ BC then x equals :
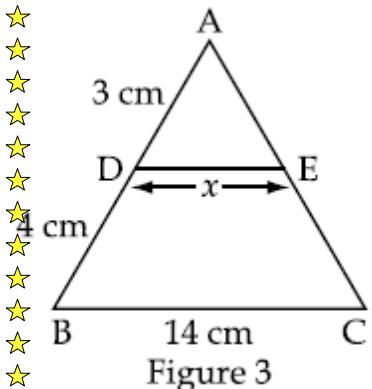
Figure 3

(A) 6 cm   (B) 7 cm   (C) 3 cm   (D) 4 cm

SECTION - 'B'

Question numbers 11 to 18 carry two marks each :

11. Can $(x-7)$ be the remainder on division of a polynomial $p(x)$ by $(7x+2)$? Justify your answer.

12. Is $8\times7\times6\times5\times4\times3+4$ a composite number ? Justify your answer.

13. In Fig. 4 ABCD is a rectangle. Find the values of x and y.
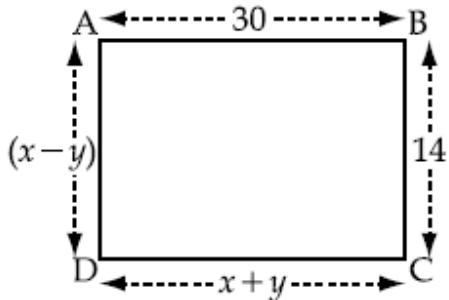
Figure 4

14. Find the mode of the following distribution

Family size	$1-3$	$3-5$	$5-7$	$7-9$	$9-11$
No. of families	7	8	2	2	1

15. If $\sin(A + B) = \cos(A - B) = \dfrac{\sqrt{3}}{2}$ and A, B (A > B) are acute angles, find the values of A and B .

OR

If $\tan \theta = \dfrac{5}{12}$ find the value of :

$$\dfrac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta}$$

16. The marks obtained by 60 students, out of 50 in a Mathematics examination, are given below.

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
No. of students	5	13	12	20	10

Write the above distribution as 'less than type cumulative frequency distribution.'

17. In figure 5, if PQ ∥ CB and PR ∥ CD , prove that $\dfrac{AR}{AD} = \dfrac{AQ}{AB}$
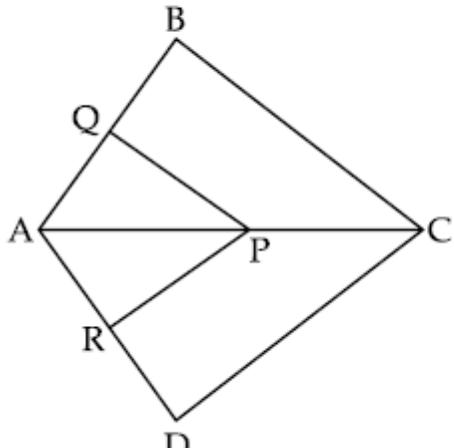

Figure 5

**18.** In fig 6, PM = 6 cm, MR = 8 cm and QR = 26 cm, find the length of PQ.
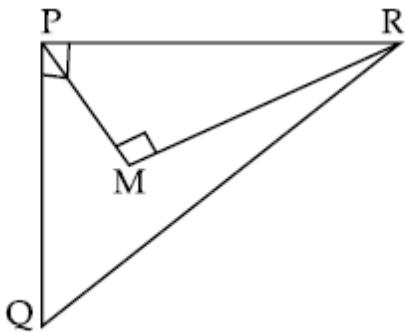
Figure 6

SECTION - 'C'

Question numbers 19 to 28 carry 3 marks each :

19 Prove that $\dfrac{3}{2\sqrt{5}}$ is an irrational number.

OR

Prove that $3 + \sqrt{5}$ is an irrational number.

20 A lending library has a fixed charge for first three days and an additional charge for each day there after. Bhavya paid Rs. 27 for a book kept for seven days, while Vrinda paid Rs 21 for a book kept for five days. Find the fixed charge and the charge for ecah extra day.

OR

The sum of the digits of a two digit number is 5. On reversing the digits of the number, it exceeds the original number, by 9. Find the original number.

21. If α, β are zeroes of the polynomial $x^2 - 4x + 3$ then form a quadratic polynomial whose zeroes are 3α and 3β.

22. ABC is an isosceles triangle, right angled at C. Prove that $AB^2 = 2BC^2$.

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

24. Prove that $(\operatorname{cosec}\theta - \cot\theta)^2 = \dfrac{1-\cos\theta}{1+\cos\theta}$

25. In a trapezium ABCD, AB ∥ DC . Its diagonals AC and BD intersect at O. Show that

$\dfrac{OA}{OC} = \dfrac{OB}{OD}$

26. If $m\sin\theta + n\cos\theta = p$ and $m\cos\theta - n\sin\theta = q$ then prove that $m^2 + n^2 = p^2 + q^2$

27 Find the median of the following data.

Classes	500 – 600	600 – 700	700 – 800	800 – 900	900 – 1000
Frequency	40	28	35	22	25

28 Find the mean of the following frequency distribution, using step deviation method.

Classes	100 – 150	150 – 200	200 – 250	250 – 300	300 – 350
Frequency	4	5	12	2	2

OR

The mean of the following frequency distribution is 25. Determine the value of p

Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	18	15	p	6

SECTION - D

Question numbers 29 to 34 carry 4 marks each :

29. Solve graphically the pair of linear equations $3x+y-5=0$ and $2x-y-5=0$ shade the triangular area formed by two lines with y axis.

30. Find other zeroes of the polynomial $x^4+x^3-9x^2-3x+18$ if it is given that two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

31. Prove that $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$.

32. Prove that $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{1+\cos\theta}{\sin\theta} = 2\csc\theta$

cbse guess

OR

Evaluate $\dfrac{\cos 70°}{\sin 20°} + \dfrac{\cos 55° \csc 35°}{\tan 5° \tan 25° \tan 45° \tan 65° \tan 85°}$

33. The following distribution gives the annual profit earned by 30 shops of a shopping complex.

Profit (in Lakh Rs.)	0 − 5	5 − 10	10 − 15	15 − 20	20 − 25
No. of shops	3	14	5	6	2

Change the above distribution to more than type distribution and draw its ogive.

34. If a line is drawn parallel to one side of a triangle to intersect the other sides in distinct points, then prove that the line drawn, divides the two sides in the same ratio.

OR

Prove that in a right triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides.

IF YOU WANT-

(1)   R.D.SHARMA UNSOLVED EXERCISE SA-1

(2)   PREVIOUS YEARS SA-1 MATHS QUESTIONS

(3)   NCERT EXEMPLER PROBLEM SOLUTIONS

**   (4- CHAPTERS) SA-1 MATHS**

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