

Stage III

Sample QUESTION PAPER

unsolved

M A T H E M A T I C S

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

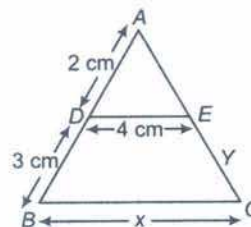
Que 1. $\sqrt{7}$ is

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

Que 2. $\frac{\cos 37^\circ}{\sin 53^\circ}$ is equal to

- | | |
|---------------------|---------------------|
| (a) $\frac{37}{53}$ | (b) $\frac{53}{37}$ |
| (c) $\frac{3}{5}$ | (d) 1 |

Que 3. In the given figure, if $DE \parallel BC$, then x is equal to



- | | |
|-----------|-------------|
| (a) 6 cm | (b) 8 cm |
| (c) 10 cm | (d) 12.5 cm |

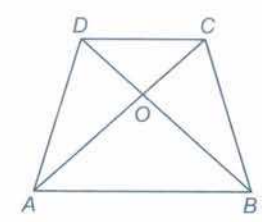
- Que 4.** For a given data with 70 observations, less than ogive and more than ogive intersect at (20.5, 35). The median of the data is
 (a) 20 (b) 35
 (c) 70 (d) 20.5
- Que 5.** The value of $\tan 10^\circ \tan 15^\circ \tan 75^\circ \tan 80^\circ$ is equal to
 (a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$
- Que 6.** If one zero of the quadratic polynomial $4x^2 + kx - 1$ is 1, then the value of k is equal to
 (a) 5 (b) -5
 (c) 3 (d) -3

- Que 7.** If $\triangle ABC$ is right angled at C and $\sin A = \frac{\sqrt{3}}{2}$, then the value of $\sec B$ is
 (a) $\frac{\sqrt{3}}{2}$ (b) 2
 (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{2}{\sqrt{3}}$
- Que 8.** If $\sin \theta = \frac{1}{3}$, then the value of $9 \cot^2 \theta + 9$ is equal to
 (a) $\frac{1}{8}$ (b) 1
 (c) 9 (d) 81

Section B

- Que 9.** If α and β are two zeroes of the polynomial $p(x) = x^2 - 8x + a$ and $\alpha^2 + \beta^2 = 40$, find the value of a .
- Que 10.** If the HCF of 54 and 336 is 6, find their LCM.
- Que 11.** If $\sin(A + B) = \sin A \cos B + \cos A \sin B$, then find the value of $\sin 75^\circ$.
- Que 12.** Calculate the mode when mean is 146 and median is 130.

- Que 13.** In the given figure, $ABCD$ is a trapezium in which $AB \parallel CD$ and $AB = 2CD$. If the area of $\triangle AOB = 84 \text{ cm}^2$, find the area of $\triangle COD$.



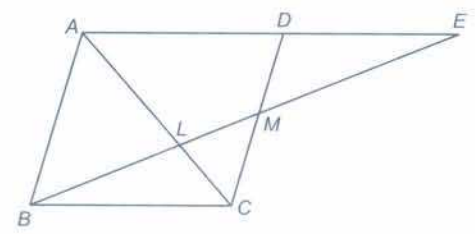
- Que 14.** $\sqrt{3} \tan \theta = 3 \sin \theta$, find the value of $\sin^2 \theta - \cos^2 \theta$.

Section C

- Que 15.** Evaluate $\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 2 \operatorname{cosec}^2 58^\circ - 2 \cot 58^\circ \tan 32^\circ - 4 \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$.
- Que 16.** Prove that $3 + \sqrt{2}$ is an irrational number.
- Que 17.** Five years ago, Ramesh was thrice of Shyam's age. Ten years later, Ramesh will be twice of Shyam's age. How old are Ramesh and Shyam?

A two digit-number is 5 times the sum of its digits and is equal to 5 more than twice the product of its digits. Find the number.

- Que 18.** In the given figure, M is mid-point of side CD of a parallelogram $ABCD$. The line BM is drawn intersecting AC at L and AD produced at E . Prove that $EL = 2BL$.



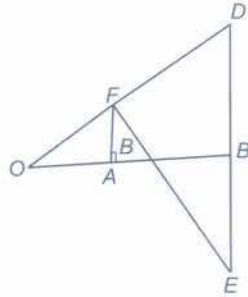
OR

Que 19. If $\tan\theta + 1 = \sqrt{2}$, show that $\cos\theta - \sin\theta = \sqrt{2} \sin\theta$.

OR

If $\operatorname{cosec}\theta - \sin\theta = l$ and $\sec\theta - \cos\theta = m$, prove that $l^2 m^2 (l^2 + m^2 + 3) = 1$.

Que 20. Find the mode for the following data.



| Class | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|-----------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 4 | 8 | 10 | 12 | 10 | 4 | 2 |

Que 21. In figure, OB is the perpendicular bisector of the line segment DE , $FA \perp OB$ and FE intersects OB at the point C . Prove that

$$\frac{1}{OA} + \frac{1}{OB} = \frac{2}{OC}$$

Que 22. If α and β are zeroes of the quadratic polynomial $f(x) = 3x^2 - 6x + 4$, find the value of

$$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\alpha\beta.$$

Que 23. Find the largest number which divides 398, 436 and 542 leaving remainder 7, 11 and 15, respectively.

Que 24. If the median of the following distribution is 24. Find the value of x .

| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
|-----------|------|-------|-------|-------|-------|
| Frequency | 5 | 25 | x | 18 | 7 |

Section D

Que 25. Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less a row, there would be 3 rows more. Find the number of students in the class.

Que 26. Show that one and only one out of $n, n+4, n+8, n+12$ and $n+16$ is divisible by 5, where n is any positive integer.

Que 27. Without using trigonometric tables, evaluate the following

$$\frac{\operatorname{cosec}^2 65^\circ - \tan^2 25^\circ}{\sin^2 17^\circ + \sin^2 73^\circ} + \frac{1}{\sqrt{3}} \tan 10^\circ \tan 30^\circ \tan 80^\circ.$$

Que 28. State and prove the Basic proportionality theorem.

Que 29. If two zeroes of the polynomial $x^4 + 3x^3 - 20x^2 - 6x + 36$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

Que 30. Prove that

$$\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta.$$

Que 31. A survey was conducted by a group of students as a part of their environment awareness programme, in which they collected the following data regarding the number of plants in 20 houses in a locality.

| Number of plants | 0-2 | 2-4 | 4-6 | 6-8 | 8-10 | 10-12 | 12-14 |
|------------------|-----|-----|-----|-----|------|-------|-------|
| Number of houses | 1 | 2 | 1 | 5 | 6 | 2 | 3 |

- Which mathematical concept will be used in the question?
- Find the average (mean) number of plants per house.
- Which method did you use for finding the mean and why?

(iv) What value(s) (quality) of the student is represented in the environment awareness programme.

Que 32. A boat covers 32 km upstream and 36 km downstream in 7 h. Also, it covers 40 km upstream and 48 km downstream in 9 h. Find the speed of the boat in still water and that of the stream.

Que 33. State and prove the converse of Pythagoras theorem.

OR

If A is the area of a right angled triangle and b is one of the sides containing right angle. Prove that the length of altitude on the hypotenuse is $\frac{2Ab}{\sqrt{b^4+4A^2}}$

Que 34. Find the mean of the following frequency distribution using step deviation method.

| Class Interval | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|----------------|-------|-------|-------|-------|-------|-------|
| Frequency | 5 | 6 | 8 | 12 | 6 | 3 |

Answers

1. (b) 2. (d) 3. (c) 4. (d) 5. (b) 6. (d) 7. (d)

8. (d) 9. 12 10. 3024 11. $\frac{\sqrt{3}+1}{2\sqrt{2}}$ 12. 98 13. 21

14. $\frac{1}{3}$ 15. -1

17. Ramesh's age = 50 yr
Shyam's age = 20 yr

OR

The number = 45

20. 45 22. 8 23. 17 24. 25 25. 60 27. $\frac{4}{3}$

29. 3, -6

31. (i) Mean

(ii) 8.1 Plants

(iii) We have used direct method because the numerical values of x and f are small.

(iv) Making people aware of the importance of plant in nature.

32. Speed of the boat = 10 km/h

Speed of the stream = 2 km/h

34. 24.625