SUMMATIVE ASSESSMENT-I — 2012-13

Mathematics

Set-B

Time Allowed : 3 Hrs. **Class – X** **M.M. : 90**

Name : ..... Sec. ..... Roll No. ..... Date .....

Sig. : .....

General Instructions :

(I) All questions are compulsory.

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

(III) There is no overall choice. However, internal choice has been provided in one question in section-B, three questions in section-C and two questions in section-D. You have to attempt only one of the alternatives in all such questions.

(iv) Write the serial number of the question before attempting it.

(v) Use of calculators is not permitted.

Section-A

1. If $HCF(n, 32) = 4$ and $LCM(n, 32) = 96$, then n is

(a) 3 (b) 4

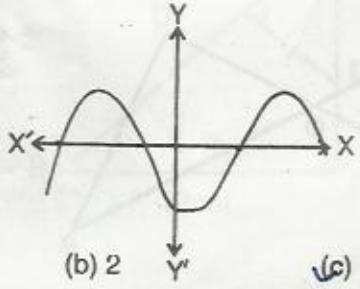
(c) 8 (d) 12

2. The empirical relation between mean, mode and median is

(a) median = 3 mean–2 mode (b) mode=3 median–2 mean

(c) mean=3 mode–2 median (d) mean=3 mode+2 median

3. In the given figure, the graph of a polynomial $p(x)$ is shown. The number of zeroes of $p(x)$ is



(a) 1 (b) 2 (c) 4 (d) 3

4. The pair of equations $2x - y + 9 = 0$, $6x - 3y + 12 = 0$ will graphically represent two lines which are

(a) intersecting at exactly one point (b) coincident

(c) parallel (d) either parallel or coincident

5. If the length of the cooresponding sides *BC* and *QR* of two similar triangles *ABC* and *PQR* are respectively 6 cm and 10 cm, then the ratio of the areas of ΔABC and ΔPQR is

(a) 3 : 5 (b) 9 : 25

(c) 25 : 9 (d) 5 : 3

6. The value of $(\tan 1° . \tan 2° . \tan 3° ..... \tan 89°)$ is :

(a) 0 (b) 1

(c) 2 (d) $\frac{1}{2}$

7. If $2 \sin 2\Theta = \sqrt{3}$, then value of Θ is :

(a) 90° (b) 30°

(c) 45° (d) 60°

8. The decimal expansion of the number $\frac{31}{2^2.5}$ will terminate after

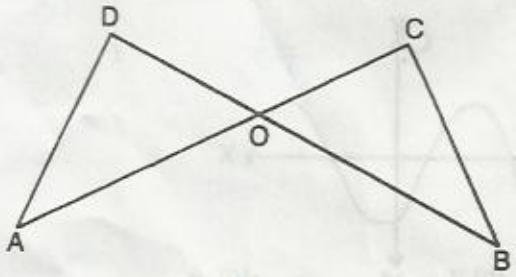
(a) One Decimal Place (b) Two Decimal Place

(c) Three Decimal Place (d) More than 3 Decimal Place

Section-B

9. In fig. *ABCD* is a trapezium in which *AB* || *DC*. The diagonals *AC* and *DB* intersect at *O*. Prove that :

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



10. Evaluate :

$$2\cos^2 60° + 3\sin^2 45° - 3\sin^2 30° + 2\cos^2 90°$$

11. Find the mode of the following distribution of marks obtained by 60 students :

Marks	0-10	10-20	20-30	30-40	40-50
No. of Students	6	5	12	22	15

12. Check whether the number 6^n can end with the digit 0 for any natural number n. Justify your answer.

OR

Explain why $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 3$ is a composite number.

13. Write a quadratic polynomial, the sum of whose zeroes is $2\sqrt{3}$ and product of its zeroes is 2.

14. For what value of 'K' will the following pair of linear equations have infinitely many solutions :

$$2x + 3y = 2; \quad (k + 2)x + (2k + 1)y = 2(k - 1)$$

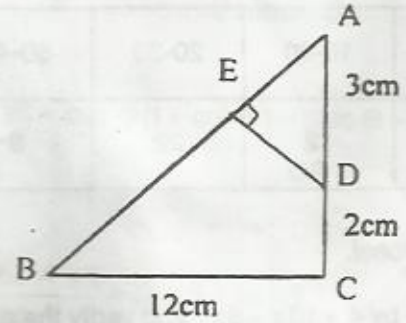
Section-C

15. ABC is an isosceles triangle, right angled at B. Two equilateral triangles ΔBCD and ΔACE are constructed with sides BC and AC.

Prove that $ar\ \Delta\ BCD = \frac{1}{2}$ ar ΔACE

OR

In the given figure, ΔABC is right angled at C and $DE \perp AB$. Prove that $\Delta ABC \sim \Delta ADE$ and hence find the lengths of AE and DE.



16. Evaluate the following :

$$\frac{3\cos 55°}{7\sin 35°} - \frac{4(\cos 70° \operatorname{cosec} 20°)}{7(\tan 5° \tan 25° \tan 65° \tan 85°)}$$

OR

$$2\left(\frac{\cos 58°}{\sin 32°}\right) - \sqrt{3}\left(\frac{\cos 38° \operatorname{cosec} 52°}{\tan 15° \tan 60° \tan 75°}\right)$$

17. Prove :

$$\frac{1+\cos A}{\sin A} + \frac{\sin A}{1+\cos A} = 2\operatorname{cosec} A$$

18. Find the mean of the following frequency distribution :

Class Interval	Frequency
0-50	10
50-100	15
100-150	30
150-200	35
200-250	25
250-300	15
Total	**130**

19. Find the median for the following data :

Class	0-10	10-20	20-30	30-40	40-50
Frequency	2	12	22	8	6

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

21. Divide $12 + 38x + 2x^2 - 12x^3$ by $4 + 10x - 6x^2$ and verify the division algorithm.

22. Solve the following pair of equations :

$$\frac{30}{x+y} - \frac{10}{x-y} = -4$$

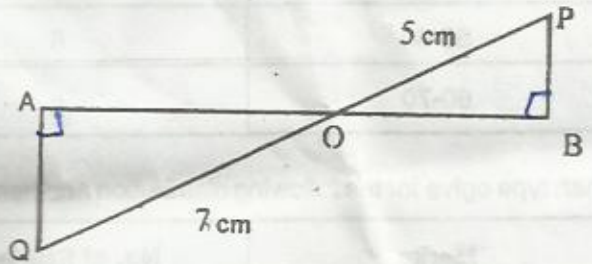
$$\frac{20}{x+y} + \frac{4}{x-y} = 8$$

23. Places *A* and *B* are 100 km apart on a highway. One car starts from *A* and another from *B* at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours, if they travel towards each other, they meet in 1 hour. What are the speeds of the two cars ?

OR

The sum of a two digit number and the number formed by reversing the order of digits is 154. If the digits differ by 4, find the numbers.

24. In the given figure, *PB* and *QA* are perpendicular to line segment *AB*. If $PO = 5$ cm and $QO = 7$ cm and area of $\Delta POB = 150\ cm^2$, find the area of ΔQOA.



Section-D

25. Prove :

$$\sin\Theta\,(1 + \tan\Theta) + \cos\Theta\,(1 + \cot\Theta) = (\sec\Theta + \operatorname{cosec}\Theta)$$

OR

Prove that :

$$\sqrt{\frac{\operatorname{cosec} A + 1}{\operatorname{cosec} A - 1}} = \sec A + \tan A$$

26. Prove that :

$$\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\tan\theta+\cot\theta$$

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

28. If the mean of following distribution, with 50 observations is 38.2. Find the value of missing frequencies f_1 and f_2.

Class Interval	Frequency
0-10	4
10-20	4
20-30	f_1
30-40	10
40-50	f_2
50-60	8
60-70	5

29. Draw a less than type ogive for the following distribution and hence obtain the median.

Marks	No. of Students
30-40	14
40-50	6
50-60	10
60-70	20
70-80	30
80-90	8
900-100	12

30. Show that the square of any positive integer is of the form $3m$ or $3m+1$ for some integer m.

31. Find all zeroes of the polynomial $2x^4 + 5x^3 - 11x^2 - 20x + 12$, if it is given that two of it's zeroes are 2 and -2.

32. Draw the graphs of the following equations : $3x - 2y = 6$; $3x + y = 15$. Find the co-ordinates of the vertices of a triangle formed by the two lines and x-axis.

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

OR

State and prove the Pythagoras Theorem.

34. If BL and CM are the medians of a right angled triangle ΔABC, right angled at A, then prove that

$$4(BL^2 + CM^2) = 5BC^2.$$