Sample Paper - 2015

Mathematics

Summative Assessment - I

(Class - X) **(Set - 1)**

Time allowed: 3 hours Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) The question paper comprises of 31 questions divided into four sections A, B, C and D. You are to attempt all the four sections.
c) Questions 1 to 4 in section A are one mark questions.
d) Questions 5 to 10 in section B are two marks questions.
e) Questions 11 to 20 in section C are three marks questions.
f) Questions 21 to 31 in section D are four marks questions.
g) There is no overall choice in the question paper. Use of calculators is not permitted.

SECTION – A

1. If two zeros of the polynomial $f(x) = x^3 - 4x^2 - 3x + 12$ are $\sqrt{3}$ and $-\sqrt{3}$, then find its third zero.

2. ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$, prove that ΔABC is a right triangle.

3. Evaluate $\cos 60° \cos 30° + \sin 60° \sin 30°$.

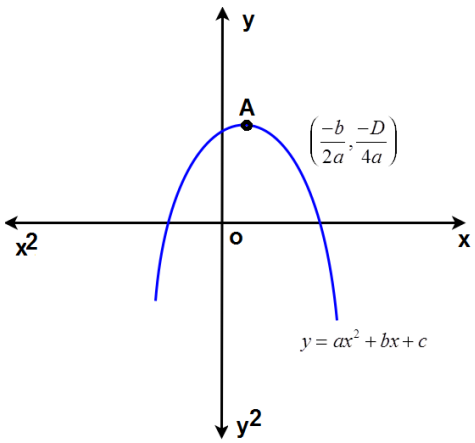
4. Prove that $\cot^2\theta - \frac{1}{\sin^2\theta} = -1$

SECTION – B

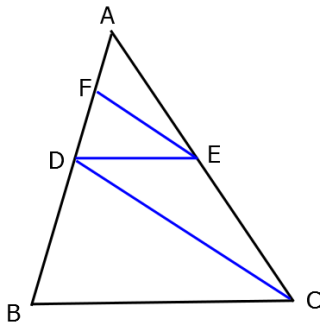
5. Find the mean and median of the daily wages of ten workers from the following data:

   22, 25, 18, 20, 28, 15, 27, 10, 9, 16

6. The graph of $y = ax^2 + bx + c$ is given in the following figure. Identify the signs of a, b and c.



7. In the given figure, DE || BC and CD || EF. Prove that $AD^2 = AB \times AF$.



8. If $\sin\theta + \sin^2\theta = 1$, find the value of $\cos^{12}\theta + 3\cos^{10}\theta + 3\cos^8\theta + \cos^6\theta + 2\cos^4\theta + 2\cos^2\theta - 2$

9. For the following grouped frequency distribution, find the mode.

Class	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Frequency	2	5	10	23	21	12	3

10. ABC is a right triangle, right angled at C. If A = 30° and AB = 40 units, find the remaining two sides and $\angle B$ of ΔABC.

SECTION – C

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

12. Solve: $\frac{x}{a} + \frac{y}{b} = 2$; $\quad ax - by = a^2 - b^2$

13. The mean of the following frequency distribution is 1.46. Find the missing frequencies.

Number of accidents (x)	0	1	2	3	4	5	Total
Frequency (f)	46	f_1	f_2	25	10	5	200

14. A ladder 15 m long reaches a window which is 9 m above the ground on one side of a street. Keeping its foot at same point, the ladder is turned to other side of the street to reach a window 12 m high. Find the width of the street.

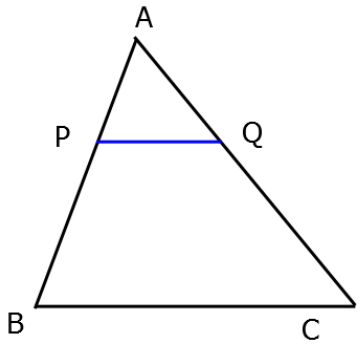
15. If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, $0° < A + B \leq 90°$, $A > B$ then find A and B.

16. Prove $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

17. Find the values of x and y if the total frequency and the median of the following data is 100 and 525, respectively.

Class interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	y	9	7	4

18. P and Q are points on sides AB and AC, respectively of ΔABC. If AP = 3 cm, PB = 6 cm, AQ = 5 cm and QC = 10 cm, show that BC = 3PQ.



19. If α and β are the zeros of the quadratic polynomial $f(x) = 2x^2 - 5x + 7$, find the polynomial whose zeros are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.

20. Prove that $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$

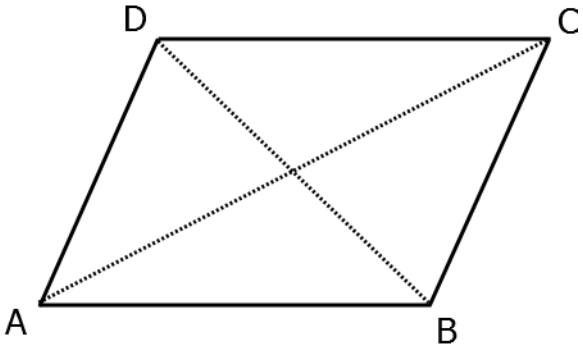
SECTION – D

21. Find all the zeros of the polynomial $f(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

22. Show graphically that the system of equations $2x + 4y = 10$; $3x + 6y = 12$ has no solution.

23. Prove that if the corresponding sides of two triangles are proportional, then they are similar.

24. ABCD is a rhombus. Prove that $AB^2 + BC^2 + CD^2 + DA^2 = AC^2 + BD^2$



25. If $\cot B = \frac{12}{5}$, prove that $\tan^2 B - \sin^2 B = \sin^4 B \sec^2 B$.

26. If (secA + tanA)(secB + tanB)(secC + tanC) = (secA – tanA)(secB – tanB)(secC – tanC), prove that each of the side is equal to ±1.

27. Apply step-deviation method to find the arithmetic mean of the following frequency distribution.

Variate (x)	5	10	15	20	25	30	35	40	45	50
Frequency (f)	20	43	75	67	72	45	39	9	8	6

28. If cosecA = $\sqrt{2}$, find the value of $\frac{2\sin^2 A + 3\cot^2 A}{4\tan^2 A - \cos^2 A}$.

29. Draw a cumulative frequency curve and cumulative frequency polygon for the following frequency distribution by less than method.

Age (in years)	0-9	10-19	20-9	30-39	40-49	50-59	60-69
Number of persons	5	15	20	23	17	11	9

30. A train covered a certain distance at a uniform speed. If the train would have been 6 km/hr faster, it would have taken 4 hours less than the scheduled time. And, if the train were slower by 6 km/hr, it would have taken 6 hours more than the scheduled time. Find the length of the journey.

31. The percentage of salary that 10 households donate to an orphanage is given below:
5, 3, 10, 5, 2, 4, 7, 8, 1, 5
Find the mean, median and mode of the data. Also tell the values depicted by the persons of these households.