Date 22.9.14 **OBVG8S3**

SUMMATIVE ASSESSMENT – I, 2014
MATHEMATICS
Class – X

Time Allowed: 3 hours **Maximum Marks: 90**

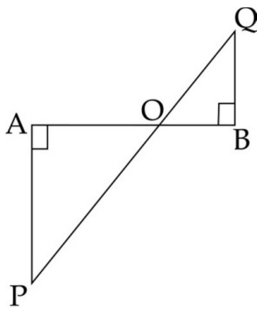
1. General Instructions:

2. All questions are **compulsory**.
3. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
4. There is no overall choice in this question paper.
5. Use of calculator is not permitted.

SECTION-A

Question numbers **1** to **4** carry one mark each

1 In the given figure, if $\angle A = 90°$, $\angle B = 90°$, AO = 6 cm, OB = 4.5 cm and AP = 4 cm, then find QB. 1



2 Evaluate : $\sec^2 60° + \sec 0°$ 1

3 Evaluate : $10 \cdot \dfrac{1 - \cot^2 45°}{1 + \sin^2 90°}$ 1

4 Following distribution gives cumulative frequencies of 'more than type' : 1

Marks obtained	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20
Number of students (cumulative frequency)	30	23	8	2

Change the above data to a continuous grouped frequency distribution

SECTION-B

Question numbers **5** to **10** carry two marks each.

5 Find whether decimal expansion of $\dfrac{13}{64}$ is a terminating or non-terminating decimal. If it terminates, find the number of decimal places its decimal expansion has. 2

6 Find LCM of the numbers given below : 2
m, 2m, 3m, 4m and 5m, where m is any positive integer.

7 For what value of k does the pair of equations given below has a unique solution ? 2
$2x + ky = 6$
$4x + 6y = 0$

8	Aman walks 50 m South and then she walks 120 m towards East. Find the distance she travelled from the starting point.	2
9	Simplify : $\frac{\tan 28^\circ}{\cot 62^\circ} \div \frac{1}{\sqrt{3}} [\tan 20^\circ . \tan 60^\circ . \tan 70^\circ]$	2
10	The following distribution shows the daily pocket allowance of children of a locality :	2

Daily pocket allowance (in Rs.)	10	15	20	25	30
Number of children	8	7	15	6	4

Find the median of the data

SECTION-C

Question numbers **11** to **20** carry three marks each.

11	Prove that $\sqrt{3}$ is an irrational number.	3
12	If one zero of a polynomial $x^2 + (3 - \sqrt{2})x - 3\sqrt{2}$ is $\sqrt{2}$, then find the other zero.	3
13	Determine graphically whether the following pair of linear equations $2x-3y=8$ $4x-6y=16$ has (i) a unique solution, (ii) infinitely many solutions or (iii) no solution	3
14	Solve for x and y : $x+4y=27xy$ $x+2y=21xy$	3
15	A vertical pole of length 8 m costs a shadow 6 m long on the ground and at the same time a tower casts a shadow 30 m long. Find the height of tower.	3
16	ΔABC is a right angled triangle in which $\angle B = 90^\circ$. D and E are any points on AB and BC resp. Prove that $AE^2 + CD^2 = AC^2 + DE^2$	3
17	Prove that : $(1 + \cot\theta - \text{cosec}\,\theta)(1 + \tan\theta + \sec\theta) = 2$	3
18	If $\sin 2x = \sin 30^\circ . \cos 60^\circ + \sin 60^\circ . \cos 30^\circ$ then find the value of x.	3
19	In the following distribution, find the missing frequency p, when it is given that mean is 52.4 :	3

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	14	p	24	32	10	2

20	A contractor paid daily wages to the labourers as follows :						3

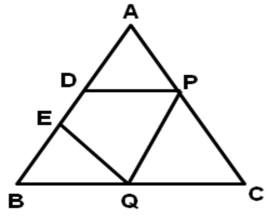
Daily wage (in Rs.)	200-250	250-300	300-350	350-400	400-450	450-500	500-550
Number of labourers	3	4	8	7	6	6	7

Find the median wages of the labourers.

SECTION-D

Question numbers **21** to **31** carry four marks each.

21	State Fundamental Theorem of Arithmetic. Is it possible for the HCF and LCM of two numbers to be 18 and 378 respectively. Justify your answer.	4

22	Mr. Sharma and Mr. Arora are family friends and they decided to go for a trip. For the trip they reserved their rail tickets. Mr. Arora has not taken a half ticket for his child who is 6 year old where as Mr. Sharma has taken half tickets for his two children who are 6.5 years and 8 years old. A railway half ticket costs half of the full fare but the reservation charges are the same as on a full ticket. Mr. and Mrs. Arora paid Rs.1700, while Mr. and Mrs. Sharma paid Rs.2700. Find the full fare of one ticket and the reservation charges per ticket. What difference you find in their behaviour and which one you will choose for yourself ?	4
23	A sum of a two digit number and number obtained on reversing the digits is 99. If number obtained on reversing the digits is 9 more than the original number. Find the number.	4
24	Divide polynomial $x^4 - 6x^3 + 8x^2 + 7x - 10$ by $x^2 - 4x + 3$ and find quotient and remainder. Also verify the division algorithm.	4
25	If in a right angled triangle, a perpendicular is drawn from the right angle to the hypotenuse, then prove that the triangles formed on both side of perpendicular are similar. Also prove that they are similar to the given triangle.	4
26	In the figure there are two points D and E on side AB of $\Delta\ ABC$ such that AD=BE. If DP || BC and EQ || AC, then prove that PQ || AB.  	4
27	Check if $b^2x^2 - a^2y^2 = a^2b^2$ for (i) $x = a \sec\theta$, $y = b \tan\theta$ (ii) $x = \text{cosec}\,\theta$, $y = b \cot\theta$	4
28	Prove that : $(\text{cosec}\,\theta + \cot\theta)^2 = \dfrac{\sec\theta + 1}{\sec\theta - 1}$	4
29	If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$	4
30	The literacy rate of females in 50 cities is given in the frequency distribution :	4

Literacy rate (in %)	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of cities	3	2	6	15	8	7	5	4

Find the mode and median of this data.

31	Given below are ages of 100 people in a locality :	4

Age (in years)	More than or equal to 10	More than or equal to 20	More than or equal to 30	More than or equal to 40	More than or equal to 50	More than or equal to 60	More than or equal to 70	More than or equal to 80	More than or equal to 90
Number of people	100	91	80	63	37	24	16	5	1

Draw a 'more than type' ogive. From the ogive, find median and verify it by actual calculations.