Summative Assessment-1 2014-2015
Mathematics
Class – X

Time allowed: 3:00 hours   Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) Question paper contains 31 questions divide into 4 sections A, B, C and D.
c) Question No. **1 to 4** of **Section – A** are very short type questions, carrying 1 mark each. Question No. **5 to 10** of **Section – B** are of short answer type questions, carrying 2 marks each. Question No. **11 to 20** of **Section – C** carry 3 marks each. Question No. **21 to 31** of **Section – D** carry 4 marks each.
d) There are no overall choices in the question paper.
e) Use of calculator is not permitted.

Section A

Question numbers 1 to 4 carry 1 mark each.

1. In ΔPQR, E and F points on the sides PQ and PR respectively such that $EF \parallel QR$. If PE=6 cm, QE=2 cm and FR=3cm, then find PF.

2. Find the value of $\dfrac{1}{3}.\dfrac{\cos 36°}{\sin 54°} - \dfrac{3}{2}.\dfrac{\sec 16°}{\cos ec\,74°}$

3. If $\tan \theta = \dfrac{1}{\sqrt{3}}$, find the value of $\sin(90° - \theta)$

4. Write the empirical relationship between the three measures of central tendency.

Section B

Question numbers 5 to 10 carry 2 marks each.

5. Find the value of:

    $(-1)^n + (-1)^{2n} + (-1)^{2n+1} + (-1)^{4n+2}$, where n is any positive odd integer.

6. Determine the values of m and n so that the prime factorization of 10500 is expressible as $2^m \times 3 \times 5^n \times 7$

7. Find the zeroes of the quadratic polynomial $x^2 - 7x + 12$ and verify the relationship between the zeroes and the coefficients.

8. Find the side of a rhombus whose diagonal are of length 60 cm and 80 cm.

9. Simplify:

    $\dfrac{\tan 28°}{\cot 62°} \div \dfrac{1}{\sqrt{3}}[\tan 20°.\tan 60°.\tan 70°]$

10. Given below is a cumulative frequency distribution table showing daily income of 50 workers of a factory:

Daily income (in Rs.)	More than or equal to 200	More than or equal to 300	More than or equal to 400	More than or equal to 500	More than or equal to 600
Number of workers	50	42	30	18	05

Draw cumulative frequency curve (ogive) 'of more than' type for this data.

Section C

Question number from 11 to 20 carry 3 marks each.

11. Prove that $\sqrt{8}$ is an irrational number.

12. Solve the following pair of equations for x and y:

$$\frac{4}{x} + 5y = 7$$

$$\frac{3}{x} + 4y = 5$$

13. Solve the following pair of linear equations by the elimination method:

2x+3y=7

3x-2y=3

14. What should be added in the polynomial $3x^4 - 4x^3 - 6x^2 + 4$ so that it is completely divisible by $x^2 - 2$

15. In ΔABC, perpendicular drawn from A intersects BC at D such that 3 DB=CD. Prove that $2AB^2 = 2AC^2 - BC^2$

16. In the figure ΔABC and ΔDBC have same base BC and lie on the same side. If $PQ \parallel BA$ and $PR \parallel BD$, then prove that $QR \parallel AD$

17. Prove that:

(1 + tan A + cot A).(sin A – cos A)=sin A. tan A – cot A. cos A
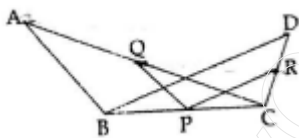
18. Evaluate:

$$\frac{\sec\theta.\cos ec(90° - \theta) - \tan\theta.\cot(90° - \theta) + \sin^2 55° + \sin^2 35°}{\tan 10°.\tan 20°.\tan 60°.\tan 70°.\tan 80°}$$

19. Heights of students of class X are given in the following frequency distribution:

Height (in cm)	150-155	155-160	160-165	165-170	170-175
Number of students	15	8	20	12	5

Find the modal height.

20. A school conducted a test (of 100 marks) in English for students of class X. The marks obtained by students are shown in the following table:

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	1	2	4	15	15	25	15	10	2	1

Find the modal marks.

Section D

Questions 21 to 31 carry 4 marks each.

21. State Euclid division Lemma. Using it show that square of any positive integer is either of the form 5cm or $5m \pm 1$, where m is an integer.

22. On the independence day celebration in the school, number of students participated in the celebration. School management has decided to distribute some sweets amongst the participants and athe audience. If total number of sweets were represented by $8x^4 + 14x^3 - 2x^2 + 7x - 8$, each one received $2x^2 + 2x - 1$ sweets and 14x – 10 remained undistributed, find the number of students to whom sweets were distributed.

23. If a polynomial $-2x^4 - 3x^3 + 6x^2 + 3x - 2$ is divided by another polynomial $-2x^2 - 3x + 4$, then remainder is px+q. Find the value of p and q.

24. Mini scored 150 marks in a test getting 3 marks for each correct answer and losing 2 marks for each wrong answer. Had 4 marks been awarded for each correct answer and 1 mark been deducted for each incorrect answer, then she would have scored 250 marks. How many questions were there in the test, if she attempted all the questions.

25. In the given figure, AB and CD are two pillars P is a point on BD such that BP=16 m and PD=12 m. If CD=16 m and AC=52 m, then find AB and AP when it is given that $\angle APC = 90°$
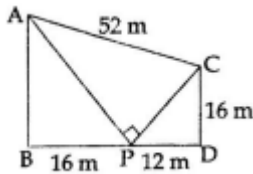
26. If $\Delta ABC \sim \Delta DEF$ and AX, DY are respectively the medians of ΔABC and ΔDEF. Then prove that
   a) $\Delta ABX \sim \Delta DEY$
   b) $\Delta ACX \sim \Delta DFY$
   c) $\dfrac{AX}{DY} = \dfrac{BC}{EF}$

27. Given that $\tan(A - B) = \dfrac{\tan A - \tan B}{1 + \tan A . \tan B}$; evaluate $\tan 15°$ in two ways.
   a) Taking $A = 60°, B = 45°$
   b) Taking $A = 45°, B = 30°$

28. If $\tan \theta + \dfrac{4}{\tan \theta} = 5$, find $\sin \theta$ and $\cos \theta$.

29. If x=cot A + cos A = cot A – cos A; prove that:

$$\left(\frac{x-y}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2 = 1$$

30. The annual profits earned by shops of a particular shopping mall are given in the following distribution:

Profit (in lakh)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of shops	4	8	15	20	25	18	12	7	3

Draw a 'less than type' ogive and a 'more than type' ogive for this data.

31. In a check-up of heart beat rate of 50 females, it was found that median heart beat is 78. Find the missing frequencies f_1 and f_2 in the following frequency distribution:

Number of heart beats per minute	64-68	68-72	72-76	76-80	80-84	84-88	88-92
Number of females	4	5	f_1	f_2	9	7	1

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