Aanchal
1.

SFS

SUMMATIVE ASSESSMENT – I, 2014
MATHEMATICS
Class – X

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

General Instructions:

1. All questions are **compulsory**.
2. 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.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

Question numbers 1 to 4 carry one mark each.

1. A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and top reaches 6 m above ground. Find the length of the ladder. $\sqrt{42.25}$ m   1

2. If $\tan\theta = \sqrt{3}$, find the value of $\sin\theta.\cos\theta$.   1

3. If $\cos A = \dfrac{21}{29}$, find the value of $\cos B$, when it is given that $\triangle ABC$ is right angled at C. $\dfrac{20}{29}$ 1

4. In a frequency distribution, if a = assumed mean = 25, $\Sigma fi = 50$ and $\Sigma fi\, di = -50$, then find the mean of the distribution. 24   1

SECTION-B

Question numbers 5 to 10 carry two marks each.

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

6. Find the prime factorisation of the denominator of rational number expressed as $6.\overline{12}$ in simplest form.   2

7. Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident : no solution   2

   $2x - 3y + 6 = 0$
   $4x - 5y + 2 = 0$ $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

8. If the sides of a rectangular plot are $5\sqrt{3}$ m and 5 m, then find the length of the diagonal.   2

9. Simplify :   2

   $\dfrac{1 + \tan^2 A}{1 + \cot^2 A}$ $\tan^2 A$

10. The following distribution shows the daily pocket allowance of children of a locality :   2

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

Find the median of the data.   21.6

SECTION-C

Question numbers 11 to 20 carry three marks each.

11. Find the decimal expansion of $\dfrac{919}{2^3 \times 5^2}$. Find out after how many decimal places it terminate

12. If three zeroes of a polynomial $x^4 - x^3 - 3x^2 + 3x$ are 0, $\sqrt{3}$ and $-\sqrt{3}$, then find the fourth zero.

13. Divide the polynomial $2x^4 - 6x^3 + 7x^2 - 4x - 2$ by the polynomial $2x^2 - 2x + 1$ and verify the division algorithm.

14. Solve for x and y :
$2x + y = 6,$ $\qquad 2x - y + 2 = 0$
[handwritten: $u = 1$, $y = 4$]
3

15. $\triangle ABC$ and $\triangle AMP$ are two right angle triangles right angled at B and M. Prove that $CA \times MP = PA \times BC$
3
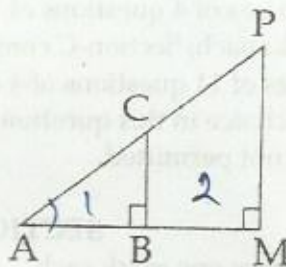
16. From airport two aeroplanes start at the same time. If speed of first aeroplane due North is 500 km/hr and that of other due East is 650 km/hr, then find the distance of two aeroplanes after 2 hours.
[handwritten: $\sqrt{2690000}$ km]
3

17. a cosec $A = p$ and b cot $A = q$, then prove that $\dfrac{p^2}{a^2} - \dfrac{q^2}{b^2} = 1$.
3

18. Given $\sqrt{3}\tan 5\theta = 1$, find the value of θ. *[handwritten: 12°]*
3

19. Heights of 50 girls of class X of a school are recorded as follows :
3

Height (in cm)	135-140	140-145	145-150	150-155	155-160	160-165
Number of girls	5	8	9	12	14	2

Find the mean height of the above data. *[handwritten: 150.3 reduced to 150]*

20. Find the value of x and y if the median of the following frequency distribution is 29.

Class	15-20	20-25	25-30	30-35	35-40	40-45	Total
Frequency	12	18	x	25	y	5	100

[handwritten: -90 and 130]

SECTION-D

Question numbers 21 to 31 carry four marks each.

21. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 8 a.m., at what time will they change together again. *[handwritten: HCF ; 12 seconds.]*
4

22. Raghav scored 70 marks in a test, getting 4 marks for each right answer and losing 1 mark for each wrong answer. Had 5 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Raghav would have scored 80 marks. How many questions were there in the test?
Which value would Raghav violate if he resorts to unfair means?
4

23. Find all other zeroes of the polynomial $3x^4 - 12x^3 + 10x^2 + 8x - 8$, if two of its zeroes are $\sqrt{\dfrac{2}{3}}$ and $-\sqrt{\dfrac{2}{3}}$.
4

No. obtained = 1. $\frac{n=7}{y=16}$ Fraction $\frac{7}{16}$

A fraction becomes $\frac{1}{2}$ when 1 is added to the numerator and it becomes $\frac{1}{3}$ when 1 is 4
subtracted from the numerator and 2 is added to the denominator. Find the fraction. Also find
the number obtained when 5 is added to numerator and 4 is subtracted from the denominator.

25. In $\triangle ABC$, $AX \perp BC$ and Y is middle point of BC. Then prove that 4
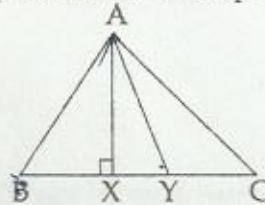
(i) $AB^2 = AY^2 + \dfrac{BC^2}{4} - BC.XY$

(ii) $AC^2 = AY^2 + \dfrac{BC^2}{4} + BC.XY$

26. In the figure, P is any point on side BC of $\triangle ABC$. PQ∥BA and PR∥CA are drawn. RQ is 4
extended to meet BC produced at S. Then prove that $SP^2 = SB \times SC$.
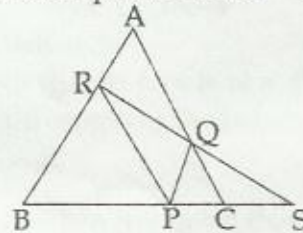
27. Prove that : 4
$$(\sec\theta - \tan\theta)^2 = \frac{\csc\theta - 1}{\csc\theta + 1}$$

28. If $\theta = 60°$, verify the following : 4

(i) $\sin\theta = \dfrac{\tan\theta}{\sqrt{1 + \tan^2\theta}}$ $\dfrac{\sqrt{3}}{2} = \dfrac{\sqrt{3}}{2}$

(ii) $\tan\theta = \dfrac{\sqrt{1 - \cos^2\theta}}{\cos\theta}$ $\sqrt{3} \neq \dfrac{\sqrt{3}}{2}$

29. Prove that $b^2x^2 - a^2y^2 = a^2b^2$, if : 4
(i) $x = a\sec\theta$, $y = b\tan\theta$, or
(ii) $x = a\csc\theta$, $y = b\cot\theta$;

30. Pocket money of 100 students is given in the following frequency distribution : 4

Pocket money (in ₹)	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Number of students	4	6	10	20	30	20	10

Draw a 'less than' ogive and 'a more than' ogive for the above data.

31. In an apple orchard, the number of apples on 80 trees are as follows : 4

Number of apples	40-60	60-80	80-100	100-120	120-140	140-160	160-180
Number of trees	12	11	14	16	13	9	5

Find the mode and median of the above data.

Median = 103.75
Mode = 108