

T52WVZA

SUMMATIVE ASSESSMENT - I, 2015-16
MATHEMATICS
Class - X

Time Allowed: 3 hours

Maximum Marks: 90

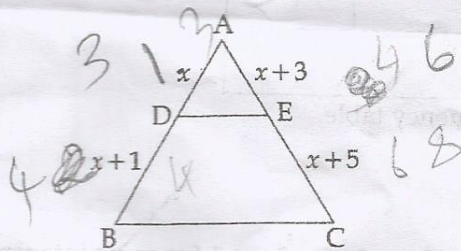
General Instructions:

- All questions are compulsory.
- 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.
- There is no overall choice in this question paper.
- Use of calculator is not permitted.

SECTION-A

Question numbers 1 to 4 carry one mark each

- 1 In $\triangle ABC$, $DE \parallel BC$, find the value of x . 1



- 2 In a triangle ABC, write $\sin \frac{A+B}{2}$ in terms of angle C. 1

- 3 If $(1 + \cos A)(1 - \cos A) = \frac{3}{4}$, find the value of $\sec A$. 1

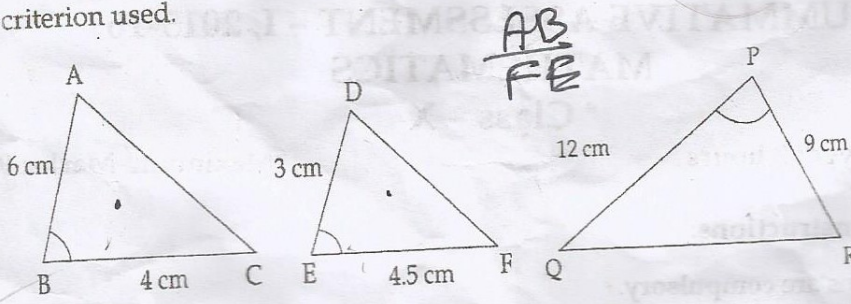
- 4 In a frequency distribution, if $a =$ assumed mean $= 55$, $\sum f_i = 100$, $h = 10$ and $-\sum f_i u_i = -30$, then find the mean of the distribution. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

- 5 Use Euclid's division algorithm to find HCF of 65 and 175. 2
- 6 Explain why the number $7 \times 5 \times 3 \times 2 + 3$ is not a prime number? 2
- 7 Solve the following pair of linear equations : $9x + 8y = 42$; $3x - 2y = 0$ 2

8 State which of the two triangles given in the figure are similar. Also state the similarity criterion used. 2

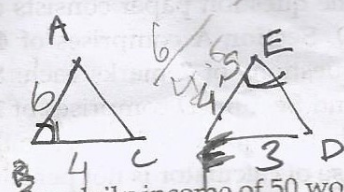


9 Prove that :

$$\frac{1 + \tan^2 A}{1 + \cot^2 A} = \tan^2 A$$

$$\frac{AB}{EF} = \frac{BC}{DE}$$

ABC ~ EFD



$$\frac{A}{B} = \frac{60}{45}$$

10 Given below is a frequency distribution table showing daily income of 50 workers of a factory: 2

Daily income of Workers (in ₹)	200-250	250-300	300-350	350-400	400-450
Number of workers	06	10	12	08	14

Change this table to a 'less than type' cumulative frequency table.

SECTION-C

- 11 Question numbers 11 to 20 carry three marks each. 3
- 12 Show that square of any positive integer is either of the form 3m or 3m + 1 for some integer m. 3
- 13 A man has certain notes of denomination ₹ 20 and ₹ 5 which amount to ₹ 380. If the number of notes of each kind are interchanged, they amount to ₹ 60 less than before. Find the number of notes of each denomination. 3
- 14 By division method check whether the polynomial $x^2 - 2x$ is a factor of the polynomial $x^3 - 5x^2 + 6x$. 3
- 15 Verify by division algorithm. 3
- 16 Solve for x and y : $3x + 4y = 13$; $2x - 3y = 3$ 3
- 17 ABC is an isosceles triangle in which $AB = AC$ and $BC^2 = 2AB^2$. Prove that ABC is a right triangle. 3
- 18 If in $\Delta ABC \sim \Delta PQR$, $BC = 18.2$ cm, $QR = 6.5$ cm and perimeter of $\Delta ABC = 140$ cm, then find the perimeter of ΔPQR . 3

17 If $2 \sin A : 3 \cos A = 3 : 4$, then find the values of $\tan A$, $\operatorname{cosec} A$ and $\cos A$.

3

18 Prove the identity :

3

$$\frac{1}{\operatorname{cosec} \theta + \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta - \cot \theta}$$

19 If the mean of the following distribution is 54, find the missing frequency x :

3

Class	0-20	20-40	40-60	60-80	80-100
Frequency	16	14	24	26	X

20 The amount of rainfall for 60 days is given in the following table :

3

Rainfall (in cm)	0-10	10-20	20-30	30-40	40-50	50-60
Number of days	20	8	7	15	6	4

Find the median rainfall.

SECTION-D

Question numbers 21 to 31 carry four marks each.

21 State Fundamental theorem of arithmetic.

4

Is it possible that HCF and LCM of two numbers be 24 and 540 respectively. Justify your answer.

22 Determine the value of k for which the following system of linear equations has infinite number of solutions :

4

$$(k-3)x + 3y = k, \quad kx + ky = 12$$

23 If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx + 8x - 9$ is negative of the other, then find the zeroes of $kx^2 + 3kx + 2$.

4

24 A NGO decided to distribute books and pencils to the students of a school running by some other NGO. For this they collected some amount from different number of people. The total amount collected is represented by $4x^4 + 2x^3 - 8x^2 + 3x - 7$. The amount is equally divided between each of the students. The number of students, who received the amount is represented by $x - 2 + 2x^2$. After distribution, $5x - 11$, amount is left with the NGO which they donated to school for their infrastructure. Find the amount received by each student from the NGO.

4

What value have been depicted here ?

25 Prove that if a line is drawn parallel to one side of triangle to intersect the other two sides in 4
distinct points the other two sides are divided in the same ratio.

26 Vertical angles of two isosceles triangles are equal. If their areas are in the ratio 16 : 25, then 4
find the ratio of their altitudes drawn from vertex to the opposite side.

27 If $\sin(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, find the value of : 4

- (i) $\tan A + \cot B$ (ii) $\sec A - \operatorname{cosec} B$.

28 If $\tan A + \sin A = m$ and $\tan A - \sin A = n$, then prove that $(m^2 - n^2)^2 = 16mn$. 4

29 Prove that : 4

$$(1 + \cot^2 \theta) \cdot (1 + \cos \theta) \cdot (1 - \cos \theta) = (1 + \tan^2 \theta) \cdot (1 + \sin \theta) \cdot (1 - \sin \theta) = 1$$

30 The following table gives the daily income of 50 workers of a factory. Draw both types ("less 4
than type" and "greater than type") ogives

Daily income (in ₹)	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
Number of workers	12	14	8	6	10

31 Find the mode of the following frequency distribution

Class interval	f
25 - 35	7
35 - 45	31
45 - 55	33
55 - 65	17
65 - 75	11
75 - 85	1