



# UNIVERSAL EDUCATION CENTRE

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SUMMATIVE ASSESSMENT – I (2015 – 2016)

MATHEMATICS

Class – X

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Time allowed: 3 hours

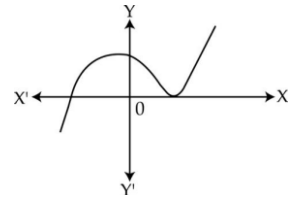
Maximum Marks: 90

## General Instructions:

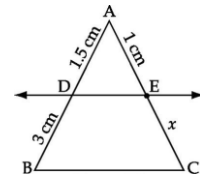
- All questions are compulsory.
- The question paper consists of 31 questions divided into four sections – A, B, C and D.
- Section A contains 4 questions of 1 mark each which are multiple choice questions, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.
- Use of calculator is not permitted.

## Section A

- Q.1 H.C.F. of two consecutive even numbers is :  
(A) 0 (B) 1 (C) 4 (D) 2
- Q.2 The graph of  $y = p(x)$  is given below. The number of zeroes of  $p(x)$  are :



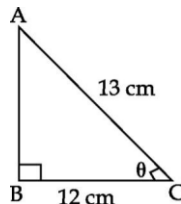
- (A) 0 (B) 3 (C) 2 (D) 4
- Q.3 In figure,  $DE \parallel BC$  then  $x$  equals to :



- (A) 2.5 cm (B) 2 cm (C) 1.4 cm (D) 4 cm
- Q.4 If  $\sin \theta = \cos \theta$ , then value of  $\theta$  is :  
(A)  $0^\circ$  (B)  $45^\circ$  (C)  $30^\circ$  (D)  $90^\circ$

## Section B

- Q.5 If  $a \cot \theta + b \operatorname{cosec} \theta = p$  and  $b \cot \theta + a \operatorname{cosec} \theta = q$  then find the value of  $p^2 - q^2$ .
- Q.6 In figure,  $AC = 13$  cm,  $BC = 12$  cm, then find the value of  $\sec \theta$ .



- Q.7 If the HCF of 85 and 153 is expressible in the form  $85n - 153$ , then find the value of  $n$ .
- Q.8 One equation of a pair of dependent linear equations is  $-5x + 7y = 2$ , then find the second equation.
- Q.9 Find The value of  $\tan 1^\circ \cdot \tan 2^\circ \cdot \tan 3^\circ \dots \dots \dots \tan 89^\circ$ .
- Q.10 The mean and median of same data are 24 and 26 respectively. Find The value of mode .

**Section C**

- Q.11 Divide  $(2x^2 + x - 20)$  by  $(x + 3)$  and verify the result by division algorithm.
- Q.12 It being given that 1 is one of the zeros of the polynomial  $7x - x^3 - 6$ . Find its other zeros.
- Q.13 For what value of  $p$  will the following system of equations have no solution  
 $(2p - 1)x + (p - 1)y = 2p + 1$ ;  $y + 3x - 1 = 0$ .
- Q.14 If  $\tan(A + B) = \sqrt{3}$  and  $\tan(A - B) = \frac{1}{\sqrt{3}}$ ,  $0^\circ < A + B \leq 90^\circ$ ;  $A > B$ , find  $A$  and  $B$ .

**OR**

If  $\sin(A + B) = \cos(A - B) = \frac{\sqrt{3}}{2}$  and  $A, B$  ( $A > B$ ) are acute angles, find the values of  $A$  and  $B$ .

- Q.15  $X$  and  $Y$  are points on the sides  $PQ$  and  $PR$  respectively of a  $\Delta PQR$ . If the lengths of  $PX, QX, PY$  and  $YR$  (in centimeters) are 4, 4.5, 8 and 9 respectively. Then show  $XY \parallel QR$ .
- Q.16 A pole of length 10 m casts a shadow 2 m long on the ground. At the same time a tower casts a shadow of length 50 m on the ground, then find the height of the tower.
- Q.17 The ages of employees in a factory are as follows :

Age in years	17 – 23	23 – 29	29 – 35	35 – 41	41 – 47	47 – 53
No. of employees	2	5	6	4	2	1

Find the median age group of the employees.

- Q.18 The following is the daily pocket money spent by students.

Pocket money (₹)	0 – 15	15 – 30	30 – 45	45 – 60	60 – 75
No. of students	8	15	7	4	6

Find the mode of the above data.

- Q.19 Prove that  $\frac{2\sqrt{3}}{5}$  is irrational.
- Q.20 Show that  $4^n$  can never end with the digit zero for any natural number  $n$ .

**OR**

If  $d$  is the HCF of 45 and 27, find  $x, y$  satisfying  $d = 27x + 45y$

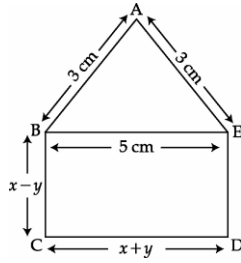
**Section D**

- Q.21 Solve the following system of linear equations by cross multiplication method :

$$2(ax - by) + (a + 4b) = 0 \quad 2(bx + ay) + (b - 4a) = 0$$

**OR**

In the figure below ABCDE is a pentagon with  $BE \parallel CD$  and  $BC \parallel DE$ .  $BC$  is perpendicular to  $CD$ . If the perimeter of ABCDE is 21 cm, find the value of  $x$  and  $y$ .

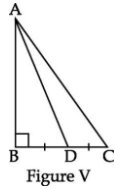


Q.22 On dividing the polynomial  $p(x)$  by a polynomial  $g(x) = 4x^2 + 3x - 2$  the quotient  $q(x) = 2x^2 + 2x - 1$  and remainder  $r(x) = 14x - 10$ . Find the polynomial  $p(x)$ .

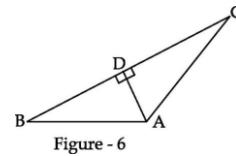
Q.23 Prove that  $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

Q.24 If  $\operatorname{cosec}(A - B) = 2$ ,  $\cot(A + B) = \frac{1}{\sqrt{3}}$ ,  $0^\circ < (A + B) \leq 90^\circ$ ,  $A > B$ , then find  $A$  and  $B$ .

Q.25 In figure,  $\triangle ABC$  is right angled at  $B$  and  $D$  is the mid point of  $BC$ . Prove that  $AC^2 = 4AD^2 - 3AB^2$ .



Q.26 In the figure given below,  $AD \perp BC$ . Prove that  $AB^2 + CD^2 = BD^2 + AC^2$  :



Q.27 Find the mean of the following frequency distribution, using step deviation method.

Classes	100 - 150	150 - 200	200 - 250	250 - 300	300 - 250
Frequency	4	5	12	2	2

OR

The mean of the following distribution is 22, find the missing frequency  $f$  :

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency	12	16	6	$f$	9

Q.28 Find the missing frequency  $f$  if the mode of the given data is 154.

Class :	120 - 130	130 - 140	140 - 150	150 - 160	160 - 170	170 - 180
Frequency :	2	8	12	$f$	8	7

Q.29 Obtain all the zeroes of the polynomial  $f(x) = x^4 - 7x^3 + 10x^2 - 14x - 2$ , if two of its zeroes are  $+\sqrt{2}$  and  $-\sqrt{2}$

Q.30 Prove that in a right triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides :

OR

If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. - Prove it.

Q.31 Draw the graph of  $2x + y = 6$  and  $2x - y + 2 = 0$ . Shade the region bounded by these lines with  $x$  axis. Find the area of the shaded region.

