

Holy Child Auxilium

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X - D  
42

**SUMMATIVE ASSESSMENT - I, 2013**  
**MATHEMATICS**  
**Class - X**

Time Allowed : 3 hours

Maximum Marks : 90

**General Instructions:**

All questions are compulsory.

The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 8 multiple choice 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 8 carry 1 mark each.

- 1 The decimal expansion of  $\frac{33}{2^2 \times 5}$  will terminate after : 1
- (a) One decimal place (b) Two decimal places  
(c) Three decimal places (d) More than three decimal places
- 2 On a morning walk, three persons step off together in the same direction and their steps measure 40 cm, 42 cm and 45 cm respectively. The minimum distance each should walk so that each can cover the same distance in complete steps is : 1
- (a) 2600 cm (b) 2400 cm  
(c) 2520 cm (d) 2500 cm
- 3 If  $ax+by=a^2-b^2$  and  $bx+ay=0$ , then the value of  $(x+y)$  is : 1
- (a)  $a-b$  (b)  $b-a$  (c)  $a-b$  (d)  $a^2+b^2$

- 4 Which of the following polynomials has the sum and product as  $-3$  and  $-9$  respectively? 1
- (A)  $x^2+3x-9$  (B)  $x^2-3x-9$   
 (C)  $x^2+3x+9$  (D)  $x^2-3x+9$
- 5 The lengths of the diagonals of a rhombus are 24 cm and 32 cm. The length of the altitude of the rhombus is : 1
- (a) 12 cm (b) 12.8 cm (c) 19 cm (d) 19.2 cm
- 6 The value of  $(\sin 45^\circ - \cos 45^\circ)$  is : 1
- (A)  $\frac{1}{\sqrt{2}}$  (B) 0  
 (C)  $\sqrt{2}$  (D) 1
- 7  $(\sin^2 \theta + \cos^2 \theta + \cot^2 \theta)$  is equal to : 1
- (A)  $\operatorname{cosec}^2 \theta$  (B)  $\tan^2 \theta$   
 (C)  $\sec^2 \theta$  (D) 1
- 8 If the 'less than' type ogive and 'more than' type ogive intersect each other at  $(20.5, 15.5)$ , then the median of the given data is : 1
- (A) 36.0 (B) 20.5 (C) 15.5 (D) 5.5

### SECTION - B

Question numbers 9 to 14 carry 2 marks each.

- 9 Show that square of any positive odd integer is of the form  $8k+1$ , where  $k$  is an integer. 2
- 10 Find 'a' and 'b' such that  $2x^3 - 6x^2 + ax + b$  is exactly divisible by  $x^2 - 3x + 2$ . 2
- 11 Find a quadratic polynomial whose zeroes are  $\frac{3 + \sqrt{5}}{5}$  and  $\frac{3 - \sqrt{5}}{5}$ . 2
- 12 Find the length of each altitude of an equilateral triangle of side 12 cm. 2

13

If  $\tan A = \frac{5}{12}$ , find the value of  $(\sin A + \cos A) \cdot \sec A$

2

14

Using the relationship connecting the three measures of central tendency, find the mean of the data which has mode 35 and median 28.

### SECTION - C

Question numbers 15 to 24 carry 3 marks each.

15

Find the LCM and HCF of 336 and 54 and verify that  $\text{LCM} \times \text{HCF} = \text{Product of the two numbers}$ .

16

Two years ago, Ram was thrice as old as his daughter and six years later, he will be four years older than twice her age. How old are they now?

17

If one zero of the quadratic polynomial  $2x^2 - 3x + p$  is 3, find its other zero. Also, find the value of  $p$ .

18

If the polynomial  $6x^4 + 8x^3 - 5x^2 + ax - b$  is exactly divisible by the polynomial  $2x^2 - 5$ , then find the values of  $a$  and  $b$ .

19

If  $AD$  and  $PM$  are altitudes of triangles  $ABC$  and  $PQR$  respectively, where  $\Delta ABC \sim \Delta PQR$ . Prove that  $\frac{AB}{PQ} = \frac{AD}{PM}$ .

20

In a  $\Delta PQR$ ,  $S$  and  $T$  are points on sides  $PQ$  and  $PR$  respectively such that  $\frac{PS}{SQ} = \frac{PT}{TR}$  and  $\angle PST = \angle PRQ$ . Prove that  $PQR$  is an isosceles triangle.

21

Show that  $\text{cosec}^2 \theta - \tan^2 (90^\circ - \theta) = \sin^2 \theta + \sin^2 (90^\circ - \theta)$ .

22

Prove that  $(\cos \theta + \sec \theta)^2 + (\sin \theta + \text{cosec} \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$

23

Find the mean for the following data :

Classes	Frequencies
24.5-29.5	4
29.5-34.5	14
34.5-39.5	22
39.5-44.5	16
44.5-49.5	6
49.5-54.5	5
54.5-59.5	3

3

24

The weights of tea in 70 packets are shown in the following table :

Weight (in gm) :	200 - 201	201 - 202	202 - 203	203 - 204	204 - 205	205 - 206
No. of packets :	13	27	18	10	1	1

3

Find the mean weight of packets using step deviation method.

## SECTION - D

Question numbers 25 to 34 carry 4 marks each.

25

There are 104 students in class X and 96 students in class IX in a school. In a house examination the students are to be evenly seated in parallel rows such that no two adjacent rows are of the same class.

- Find the maximum number of parallel rows of each class for the seating arrangement.
- Also find the number of students of class IX and also of class X in a row.
- What is the objective of the school administration behind such an arrangement?

26

If the polynomial  $p(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$  is divided by another polynomial  $x^2 - 2x + k$ , the remainder comes out to be  $x + a$ . Find  $k$  and  $a$ .

27

The sum of a 2 - digit number and the number formed by interchanging its digits is 110. If 10 is subtracted from the first number, the new number is 4 more than 5 times the sum of the digits of the first number. Find the first number.

$$x + y = 11$$

$$10x - y = 5(x + y) + 4$$

28

State and prove Thales theorem.

4

29

In fig. ABCD is a trapezium with  $AB \parallel DC$ . If  $\triangle AED$  is similar to  $\triangle BEC$ . Prove that  $AD=BC$ 

$$\triangle AED \sim \triangle BEC$$

4

30

Prove that:  $\frac{1 + \tan^2 \theta}{1 + \cot^2 \theta} = \left( \frac{1 - \tan \theta}{1 - \cot \theta} \right)^2$ 

4

31

Evaluate:  $\frac{4}{3} \cot^2 30^\circ + 3 \sin^2 60^\circ - 2 \operatorname{cosec}^2 60^\circ - \frac{3}{4} \tan^2 30^\circ$ .

4

32

If  $\sin \theta = \frac{c}{\sqrt{c^2 + d^2}}$  and  $d > 0$ , find the values of  $\cos \theta$  and  $\tan \theta$ .

$$\cos \theta = \frac{d}{\sqrt{c^2 + d^2}} \quad \tan \theta = \frac{c}{d}$$

4

33

Calculate the average daily income (in Rs.) of the following data about men working in a company:

Daily income (in Rs.)	< 100	< 200	< 300	< 400	< 500
Number of men	12	28	34	41	50

4

34

The distribution of heights (in cm) of 96 children is given below:

Height (in cm)	124-128	128-132	132-136	136-140	140-144	144-148	148-152
No. of students	7	8	17	24	20	12	8

Draw a more than type cumulative curve for the above data and use it to compute median height of the children.

4