

SUMMATIVE ASSESSMENT - I, 2016-17 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

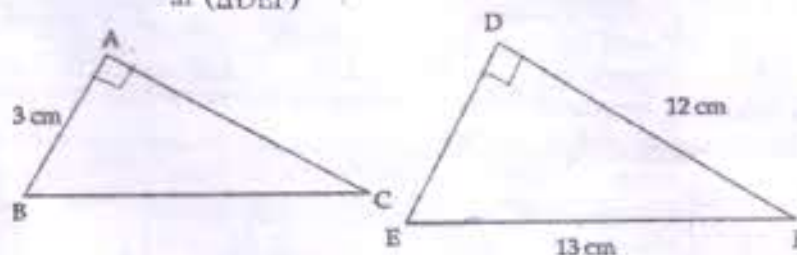
Question numbers 1 to 4 carry one mark each

- 1 In $\triangle DEW$, A and B are the points on the sides DE and DW respectively such that $AB \parallel EW$. If $AD = 4$ cm, $DE = 12$ cm and $DW = 24$ cm, then find the value of DB. 1
- 2 If $\tan \theta = \cot (45^\circ + \theta)$, then find θ . (Given $45^\circ + \theta$ is an acute angle) 1
- 3 If $\operatorname{cosec} (3x - 15^\circ) = 2$, then find x . 1
- 4 For a certain distribution, mode and median were found to be 1000 and 1250 respectively. Find mean for this distribution, using an empirical relation. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

- 5 Explain why $(17 \times 5 \times 11 \times 3 \times 2 + 2 \times 11)$ is a composite number? 2
- 6 Write down the decimal expansion of $\frac{16}{3125}$, without actual division. 2
- 7 Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident:
$$\frac{3}{2}x + \frac{5}{3}y = 7$$
$$\frac{3}{2}x + \frac{2}{3}y = 6$$
2
- 8 Given $\triangle ABC \sim \triangle DEF$, find $\frac{\operatorname{ar}(\triangle ABC)}{\operatorname{ar}(\triangle DEF)}$. 2



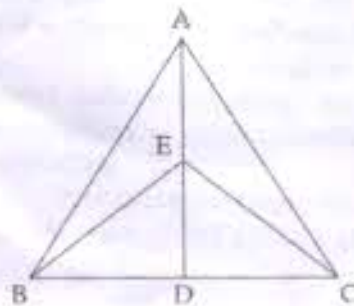
- 9 If $\sin (A+B) = \frac{\sqrt{3}}{2}$ and $\cos (A-B) = \frac{\sqrt{3}}{2}$ where $0^\circ < A+B \leq 90^\circ$ and $A > B$, find A and B. 2
- 10 Given below is a cumulative frequency distribution of 'less than type': 2

Marks obtained	less than 20	less than 30	less than 40	less than 50
Number of students (cumulative frequency)	8	13	19	24

Change the above data in to a continuous grouped frequency distribution.

SECTION-C

- Question numbers 11 to 20 carry three marks each.
- 11 Show that the square of any positive integer is either of the form $3m$ or $3m+1$ for some integer m . 3
- 12 Divide the polynomial $4x^3 - 6x^2 - 10x - 3$ by the polynomial $x^2 + x$ and verify the division algorithm. 3
- 13 Find a quadratic polynomial, the sum and product of whose zeroes are -1 and -20 respectively. Hence find the zeroes. 3
- 14 Solve by elimination : 3
 $ax + by - a + b = 0$
 $bx - ay - a - b = 0$
- 15 X is any point inside a $\triangle DEF$ and is joined to all three vertices. From point P on DX, $PQ \parallel DE$ is drawn which meets EX at Q and from Q, $QR \parallel EF$ is drawn which meets XF at R. Prove that $PR \parallel DF$. 3
- 16 $\triangle ABC$ and $\triangle EBC$ are on the same base BC. If AE produced intersects BC at D then, prove that $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle EBC)} = \frac{AD}{ED}$ 3



- 17 Evaluate : 3
 $\frac{2 \cos 67^\circ}{\sin 23^\circ} - \frac{\tan 40^\circ}{\cot 50^\circ} - \cos 0^\circ + \tan 15^\circ \cdot \tan 25^\circ \cdot \tan 60^\circ \cdot \tan 65^\circ \cdot \tan 75^\circ$
- 18 Prove the following identity. 3
 $\left(1 + \frac{1}{\tan^2 A}\right) \cdot \left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\cos^2 A - \cos^4 A}$
- 19 Find the mean of the following frequency distribution by using step deviation method. 3

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	14	24	26	20	16

- 20 The following frequency distribution shows the number of runs scored by some batsmen of India in one-day cricket matches : 3

Runs scored	2000-4000	4000-6000	6000-8000	8000-10000	10000-12000
Number of batsman	9	8	10	2	1

Find the mode for the above data.

SECTION-D

- Question numbers 21 to 31 carry four marks each.
- 21 The following data gives the information on the observed life times (in hours) of 150 electrical components : 4

Life time (in hours)	0-20	20-40	40-60	60-80	80-100
Frequency	15	10	35	50	40

Find the ~~mode of the distribution~~ HCF, and LCM of 256 and 36 by Euclid's division algorithm.

Also find their LCM.

Hence verify that $HCF \times LCM = \text{Product of two no.s}$

22 Find all other zeroes of the polynomial $x^4 - 2x^3 - 7x^2 + 8x + 12$, if two of its zeroes are -1 and 2 . 4

23 Solve graphically the pair of linear equations : 4

$$3x - 2y + 7 = 0$$

$$2x + 3y - 4 = 0$$

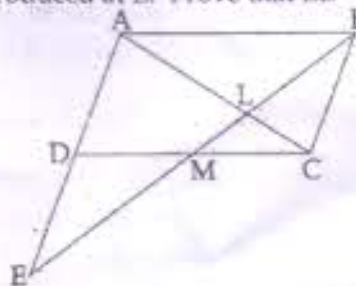
Also shade the region enclosed by these lines and x -axis.

24 Rani decided to distribute some amount to poor students for their books. If there are 8 students less, everyone will get ₹ 10 more. If there are 16 students more everyone will get ₹ 10 less. What is the number of students and how much does each get? What is the total amount distributed? 4

What is the reason that motivated Rani to distribute money for books?

25 In an equilateral ΔABC , E is any point on BC such that $BE = \frac{1}{4} BC$. Prove that $16 AE^2 = 13 AB^2$. 4

26 In the adjoining figure, M is the mid-point of the side CD of a parallelogram ABCD. BM when joined meets AC at L and AD produced at E. Prove that $EL = 2BL$. 4



27 If $A + B = 90^\circ$, prove that : 4

$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$$

28 If $\operatorname{cosec} \theta - \cot \theta = \sqrt{2} \cot \theta$, then prove that $\operatorname{cosec} \theta + \cot \theta = \sqrt{2} \operatorname{cosec} \theta$. 4

29 Prove that : 4

$$\frac{\cos A}{1 + \sin A} + \frac{\cos A}{1 - \sin A} = \frac{1 - \sin A}{\sqrt{1 + \sin A}} + \frac{1 + \sin A}{\sqrt{1 - \sin A}} = 2 \sec A$$

30 The following table gives production yield of rice per hectare in some fields of a village : 4

Production yield (in kg/hectare)	10-20	20-30	30-40	40-50	50-60
Number of farms	3	9	12	20	6

Draw a 'more than type' ogive. Also, find median from the curve.

31 If median height of 50 students of a class in the following frequency distribution is 144 cm, find the missing frequencies x and y : 4

Height (in cm)	125-130	130-135	135-140	140-145	145-150	150-155	155-160
Number of students	2	4	x	y	8	9	5

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Handwritten calculations and scribbles at the bottom of the page, including a vertical calculation: $0 \times 4 = 28$ over 26 .