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X

SUMMATIVE ASSESSMENT – I, 2015-16
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 $\triangle DEW$, $AB \parallel EW$. If $AD = 4$ cm, $DE = 12$ cm and $DW = 24$ cm, then find the value of DB.   1

2   Find the value of $\sin A \cos(90^0 - A) + \cos A \sin(90^0 - A)$ 1

3   If $\sqrt{3} \sin\theta = \cos\theta$ find the value of $\dfrac{\sin\theta \cdot \tan\theta \cdot (1+\cot\theta)}{\sin\theta + \cos\theta}$ 1

4   Following distribution gives cumulative frequencies of 'more than type' :   1

| Marks obtained	More than or equal to 5	More than or equal to 10	More than or equal to 15	More than or equal to 20
Number of students (cumulative frequency)	30	23	8	2

Change the above data to a continuous grouped frequency distribution.

SECTION B

Question numbers 5 to 10 carry two marks each.

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

6   Apply Euclid's division algorithm to find HCF of numbers 4052 and 420.   2

7   On dividing polynomial $x^3 - 4x^2 + 7x - 4$ by a polynomial $g(x)$, quotient and remainder are $x^2 - 2x + 2$ and x respectively. Find $g(x)$ 2

8   Observe the given figures of △ABC and △PQR. Then find whether they are similar or not.   2

C, 3 cm, $3\sqrt{2}$ cm, A, 4 cm, B; Q, 8 cm, R, P, $6\sqrt{2}$ cm, 6 cm
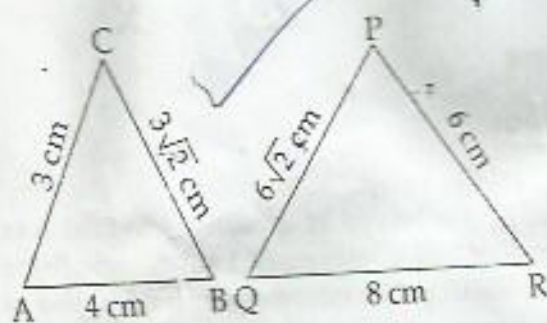
9   Prove that $(\sec^2\theta - 1)(1 - \csc^2\theta) = -1$ 2

10   For the following data, find mode :

| Class	10 – 13	13 – 16	16 – 19	19 – 22	22 – 25
Frequency	4	8	9	11	7

SECTION-C

Question numbers 11 to 20 carry three marks each.

11   Show that square of any positive odd integer is of the form $4q + 1$, for some integer q.   3

12   Solve for x and y :   3

$3x + 5y = 12$

$3x - 5y + 18 = 0$

13   Check whether polynomial $x^2 - 5x + 2$ is a factor of the polynomial $3x^4 - 5x^3 - 10x^2 + 20x - 8$. Verify by   3
division algorithm.

14   Solve for x and y :   3

$\dfrac{x}{2} + \dfrac{2y}{3} = -1$

$x - \dfrac{y}{3} = 3$

15   In equilateral △ABC, AD is an altitude. Equilateral △ADE is drawn taking AD as one of its sides.   3
Prove that area (△ADE) :ar (△ABC) = 3 : 4.

16 In given figure, $\triangle ABC \sim \triangle DEF$. AP bisects $\angle CAB$ and DQ bisects $\angle FDE$ 3
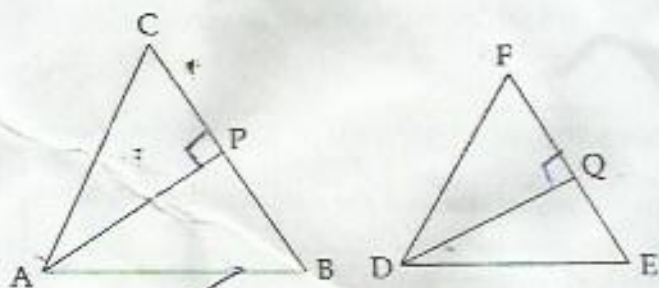
Prove that

(a) $\dfrac{AP}{DQ} = \dfrac{AB}{DE}$

(b) $\triangle CAP \sim \triangle FDQ$.

17 If $b\cos\theta = a$, then prove that $\cos ec\theta + \cot\theta = \sqrt{\dfrac{b+a}{b-a}}$ 3

18 Prove the identity : $\sin A(1+\tan A) + \cos A(1+\cot A) = \sec A + \cos ec A$ 3

19 A survey regarding the heights(in cm) of 50 boys of class X of a school was conducted and the following   3
result was obtained :

Height (in cm)	Number of boys
Less than 145	4
Less than 150	11
Less than 155	28
Less than 160	38
Less than 165	45
Less than 170	50

Find the median height of the boys.

20 Class teacher recorded the following absentee record of 30 students of Class IX for the whole year   3

Number of absentee	0-10	10-20	20-30	30-40	40-50
Number of students	10	12	5	2	1

Find the mean for the above data.

SECTION D

Question numbers 21 to 31 carry four marks each.

21 Can the number 6^n, n being a natural number, end with the digit 5? Give reasons:

22 A fraction becomes $\frac{4}{5}$ if 1 is added to both the numerator and the denominator. If, however 5 is subtracted from both the numerator and the denominator, the fraction becomes $\frac{1}{2}$. What is the fraction?

23 Find all the zeroes of the polynomial $x^4 - 3x^3 + 6x - 4$, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

24 DDA wants to make a rectangular park in the colony. If the length and breadth of the park is decreased by 2 m, then its area will be decreased by 196 square meters. Its area will be increased by 246 square meters if its length is increased by 3 m and its breadth is increased by 2 m. Find the length and breadth of the park.
What is the importance of parks in our life?

25 In the given figure, AP = 3 cm, AR = 4.5 cm, AQ = 6 cm, AB = 5 cm and AC = 10 cm, then find AD and ratio of areas of ARQ and ADC.
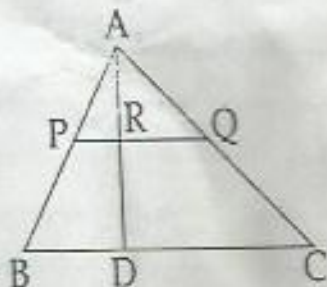
26 State and prove Pythagoras theorem.

Using the above theorem, solve the following :

In $\triangle ABC$, $AB = 6\sqrt{3}$ cm, BC = 6 cm and AC = 12 cm, find $\angle B$.

27 Evaluate $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$

28 Prove that : $\dfrac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \dfrac{1}{(\sec A - \tan A)}$

29 Prove that : $\dfrac{\sec A - 1}{\sec A + 1} = \left(\dfrac{\sin A}{1 + \cos A}\right)^2 = (\cot A - \operatorname{cosec} A)^2$

30   Pocket expenses of the students of a class in a college are shown in the following frequency   4
distribution :

Pocket expenses (in ₹)	0-200	200-400	400-600	600-800	800-1000	1000-1200	1200-1400
Number of students	33	74	170	88	76	44	25

Find the mean and median for the above data.

31   The following table gives the daily income of 50 workers of a factory. Draw more than type of   4
ogive

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