# SAMPLE QUESTION PAPER 2015

## SUMMATIVE ASSESSMENT – I, 2015 MATHEMATICS Class – X

General Instructions:

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;

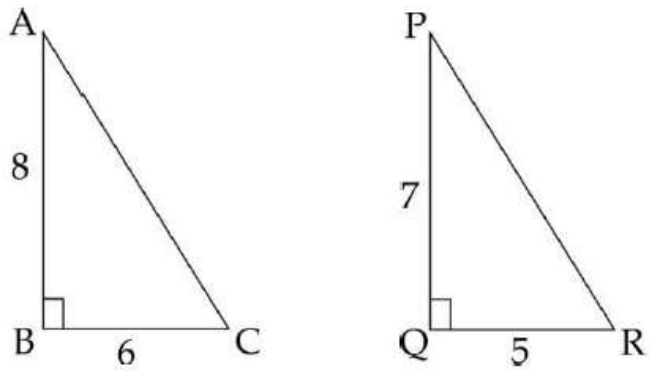
Section - B comprises of 6 questions of 2 marks each;

Section - C comprises of 10 questions of 3 marks each and

Section - D comprises of 11 questions of 4 marks each.

Section - A

1. Examine the given pair of triangles and state whether they are similar. If yes, write similarity criterion.




2. In a $\Delta$ ABC, write $\tan\frac{(A+B)}{2}$ in terms of angle C.

3. If $\sin\theta - \cos\theta = 0$, $0^0 \le \theta \le 90^0$, find the value of $\theta$.

4. In a frequency distribution, if $\sum f_i = 100$ and $\sum f_i x_i = 110$, find mean of the distribution.

Section – B

5. Show that any positive odd integer can be written in the form 6m +1, 6m+ 3 or 6m+5 for some integer m.

6 . Find the prime factorization of the denominator of the rational number equivalent to 8.39.

7 . A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Abdul paid Rs. 30 for a book kept for 6 days while Kaira paid Rs. 45 for a book kept for 9 days. Find the fixed charge and the charge for each extra day.

8 . Two similar triangles ABC and DEF are such that AB = 1/3 DE. Find ar($\Delta$ ABC) : ar($\Delta$ DEF).

9. Prove that: $\{1 + \tan^2\theta\} / \{1 + \cot^2\theta\}$

10. In a hospital, weights of new born babies were recorded, for one month. Data is as shown:

| Weight of new born baby (in kg) | 1.4 – 1.8 | 1.8 – 2.2 | 2.2 – 2.6 | 2.6 – 3.0 |
|---|---|---|---|---|
| No of babies | 3 | 15 | 6 | 1 |

Find the median weight.

Section – C

11. Prove that $7 + \sqrt{3}$ is an irrational number

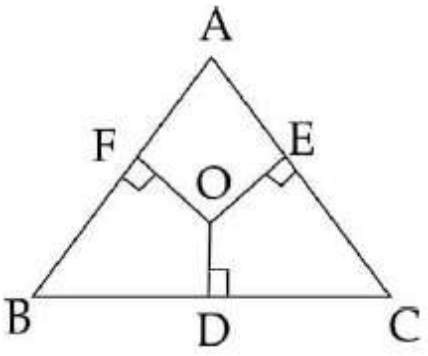
12. What should be added in the polynomial $x^4 + 5x^3 + 7x^2 + 3x + 4$ so that it is completely divisible by $x^2 + 2x + 1$

13. If $x^4 - 2x^3 + 6x^2 - 6x + k$ is completely divisible by $x^2 - 2x + 3$, then find the value of k.

14. Solve using cross multiplication method: $x + y = 6$ and $3x - y = 10$

15. In $\Delta$ ABC from any interior point O in the $\Delta$ ABC , OD $\perp$ BC and OE $\perp$ AC and OF $\perp$ AB are drawn.

Prove that $OA^2 + OB^2 + OC^2 = OD2 + OE^2 + OF^2 + AF^2 + BD^2 + CE^2$




16. In $\Delta$ ABC, AP $\perp$ BC and $AC^2 = BC^2 - AB^2$, then prove that $PA^2 = PB \times CP$

17. Given $\sqrt{3} \tan 5\theta = 1$ , find the value of $\theta$ .

18. Prove the identity: $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta) = 2$

19. A survey was conducted in Railways regarding the life insurance policies taken by the employees. Data obtained is as follows :

| Age of policy | 20-24 | 24-28 | 28-32 | 32-36 | 36-40 | 40-44 | 44-48 |
|---|---|---|---|---|---|---|---|
| Number of policy holder (in years) | 3 | 10 | 25 | 31 | 19 | 12 | 6 |

Draw a 'less than type' ogive.

20. In a small scale industry, salaries of employees are given in the following distribution table :

| Salary (in Rs.) | 4000 - 5000 | 5000 - 6000 | 6000 - 7000 | 7000 - 8000 | 8000 - 9000 | 9000- 10000 |
|---|---|---|---|---|---|---|
| Number of employees | 20 | 60 | 100 | 50 | 80 | 90 |

Find the mean salary of the employees.

Section – D

21. State fundamental theorem of Arithmetic. Using it check whether there is any value of n for which $5^n$ ends with the digit zero.

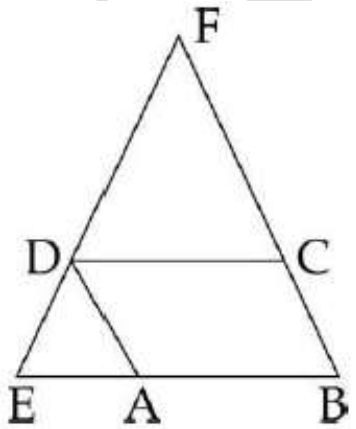
22. Sita devi wants to make a rectangular pond on the road side for the purpose of providing drinking water for street animals. The area of the pond will be decreased by 3 square feets if its length is decreased by 2 ft. and breadth is increased by 1 ft. Its area will be increased by 4 square feets if the length is increased by 1 ft. and breadth remains same. Find the dimension of the pond. What motivated Sita Devi to provide water pond for street animals ?

23 .Obtain all other zeroes of the polynomial $4x^4+ x^3- 72x^2-18x$, if two of its zeroes are $3\sqrt{2}$ and-3 $\sqrt{2}$

24. The area of a rectangle reduces by 25 sq. units, if its length is increased by 5 units and breadth is decreased by 3 units. If we increase length by 2 units and breadth by 5 units, the area increases by 285 sq. units. Find the dimensions of the rectangle.

25. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding altitudes.

26. In a parallelogram ABCD, from vertex D, a line is drawn which intersects produced BA and BC at E and F respectively. Prove AD/AE =FB/BE=FC/CD



27. Prove that : $\left(\frac{\sin A}{1+\cos A}+\frac{1+\cos A}{\sin A}\right)\left(\frac{\sin A}{1-\cos A}+\frac{1-\cos A}{\sin A}\right)=4\,cosec\,A.\cot A$

28. Given that cos (A - B) = cos A. cos B + sin A. sin B, find the value of cos $15^0$ in two ways.

(i) Taking A = $60^0$, B = $45^0$ and (ii) Taking A = $45^0$ and B = $30^0$

29.(i) If sec θ - tan θ = x show that secθ = $\frac{1}{2}\left(\frac{1}{x}+x\right)$ and tanθ $\frac{1}{2}\left(\frac{1}{x}-x\right)$

(ii) If sec θ + tan θ = x show that secθ = $\frac{1}{2}\left(\frac{1}{x}+x\right)$ and tanθ $\frac{1}{2}\left(\frac{1}{x}-x\right)$

30. Following frequency distribution shows the daily expenditure incurred on milk by 80 families. If mean is ` 44, then find the missing frequencies *x* and *y*.

| Daily expenditure (in Rs. ) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|---|---|---|---|---|---|---|---|---|---|
| Number of families | 1 | 12 | 15 | 9 | x | 13 | y | 8 | 4 |

31. Pocket expenses of a class in a college are shown in the following frequency distribution :

| Pocket expenses (in Rs) | 0-200 | 200 - 400 | 400-600 | 600-800 | 800-100 | 1000-1200 | 1200-1400 |
|---|---|---|---|---|---|---|---|
| Number of students | 3 3 | 74 | 170 | 88 | 76 | 44 | 25 |

Find the mean and median for the above data..