14/Sept./2017 Set - A

FIRST TERM EXAMINATION (14 SEPT 2017)
MATHEMATICS
Class – X

Time Allowed: 3 hours **Maximum Marks: 80**

1.

SECTION-A

Question numbers **1** to **6** carry one mark each

1 What is the LCM of p and q where $p = a^3b^2 \quad q = b^3a^2$ 1

2 Find other zero of the quadratic polynomial $y^2 + 7y - 60$ if one zero is -12. 1

3 Find the value of θ if $2\sin 2\theta = \sqrt{3}$ 1

4 Find the value of k for which the system of equations $kx - y = 2,\ 6x - 2y = 3$ has a unique solution. 1

5. If the common difference of an AP is 3 find the value of $a_{17} - a_{12}$. 1

6. If $\frac{6}{5}$, a, 4 are in AP , find a.

SECTION-B

Question numbers **7** to **12** carry two marks each.

7. Can the number 4^n, n being a natural number, end with the digit 0? Give reason. 2

8. What is the HCF of 2165 and 272 using Euclid's division algorithm. 2

9. If one root of polynomial $p(y) = 5y^2 + 13y + m$ is reciprocal of other then final value of m. 2

10. Write 7th term from the end of AP, 7, 9, 11 ..... 213 2

11. If $\tan 3A = \cot(A - 26^0);\ 3A < 90^0$ then find the value of $\angle A$ 2

12. Find the value of α if $Cosec^2\theta(1+\cos\theta)(1-\cos\theta) = \alpha$ 2

SECTION-C

Question numbers **13** to **22** carry three marks each.

13. Prove that $\sqrt{3}$ is an irrational number hence show that $5 + 2\sqrt{3}$ is an irrational number. 3

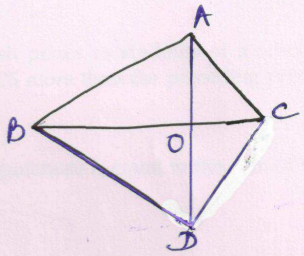
14. If α *and* β are the zeros of the polynomial $6y^2 - 7y + 2$, *find* $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ 3

15. The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increased by 67 square units. Find the dimensions of the rectangle. 3

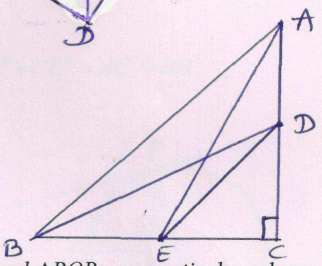
A

16. The sum of the first n terms of an AP is given by $Sn = 3n^2 - 4n$. Determine the AP and the 12th term. 3

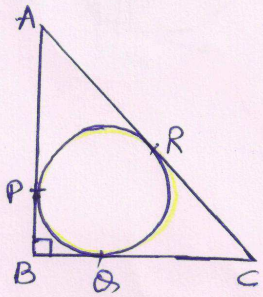
17. If the given figure. ΔABC *and* ΔDBC are on the same base BC. If AD intersects BC at 0. Prove that $\frac{ar(\Delta ABC)}{ar(\Delta DBC)} = \frac{AO}{DO}$ 3



18. D and E are points on the sides CA and CB respectively of a triangle ABC of a right triangle right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$ 3



19. If AD and PM are the medians of triangles ΔABC *and* ΔPQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$ 3



20. ΔABC is a right triangle, right angled at B such that BC=6cm and AB=8cm. Find the radius of the circle. 3

21. Without using table, evaluate the following 3

$3\cos 68^0 \; Co\sec 22^0 - \frac{1}{2}\tan 43^0 \tan 47^0 \tan 12^0 \tan 60^0 \tan 78^0$

22. If $\tan(A+B) = \sqrt{3}$ *and* $\tan(A-B) = \frac{1}{\sqrt{3}}$, $O^0 < A+B \le 90^0$ $A > B$ Find the value of A & B 3

SECTION-D

Question numbers **23** to **30** carry four marks each.

23. Use Euclid's division lemma to show that the square of any position integer is either of the form 3m or 3m+1 for some integer m. 4

24. Obtain all other zeroes of $2x^4 + 7x^3 - 19x^2 - 14x + 30$, if two of its zeroes are $\sqrt{2}$ *and* $-\sqrt{2}$. 4

25. Draw the graph of $2x + y = 6$ and $2x - y + 2 = 0$. 4

Shade the region bounded by these lines and x-axis. Find the area of the shaded region.

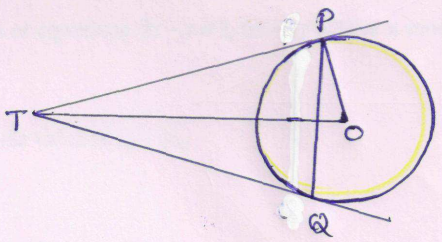
26. A sum of Rs. 2700 is to be used to give eight cash prizes to students of a school for their overall academic performance. If each prize is Rs. 25 more than the preceding prize. Find the value of each of the prize. 4

27. Prove that , in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. 4

Using the above, do the following

Prove that, in a ΔABC , if AD is perpendicular to BC, then $AB^2 + CD^2 = AC^2 + BD^2$

28. In the given figure PQ is a chord of length 16cm, of a circle of radius 10cm. The tangents of P and Q interect at a point T. find the length of TP. 4



29. $\frac{\cos ecA}{\cos ecA - 1} + \frac{\cos ecA}{\cos ecA + 1} = 2Sec^2 A$ 4

30. If $\tan\theta = \frac{a}{b}$, find the value of $\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}$ 4

A