**Sample Paper – 2013**

 **Class –XII
 Subject –Mathematics**

**General instructions:**

1. **All questions are compulsory.**
2. **Question number 1 to 10 carry 1 mark each.**
3. **Questions numbers 11 to 22 carry four marks each.**
4. **Question number 23 to 29 carry six marks each.**
5. **There is no over all choice. However, internal choice has been provided in some questions. You have to answer only one of them.**
6. **Use of calculator is not permitted.**

**SECTION A**

1. Let f: R R such that f(x) = x + 7 and g: RR Such that g(x) = x - 7 .Find gof .
2. Write the identity element for the binary operation \* defined on the set R of real numbers by the rule a \* b = , for all a, b  R.
3. If  , Find the value of x and y.
4. Evaluate:****
5. If A is a square matrix of order 3 such that , Find .?
6. What is the principal value of ?
7. Solve for x : 
8. Write the value of 
9. Find the slope of the curve  at x = 2
10. Find if 

**SECTION B**

11 Let T be the set of all triangle in a plane with R a relation in T given by

R = {(T1,T2):T1 is similar to T2}.Show that R is an equivalence relation.

12 Write the value of **or**

Solve for x; 

13.Using properties of determinants, prove that?**or**

 Prove that ?

14.Determine the value of the constant k, so that the function is continuous.

15. If prove that 

**or**Prove that 

16. If , show that 

17.If , prove that 

18. Water is dripping out from a conical funnel of semi-vertical angle  at the uniform rate of 2in its surface area through a tiny hole at the vertex in the bottom. When the slant height of the water is 4 cm, find the rate of decrease of the slant height of the water.

19. Given that for the function f defined by Rolle’s theorem holds with. Find the value of a and b.

20. Find the equations of the tangent and the normal to the curve at .

21.Show that is an increasing function on the interval 

22.Evaluate**or**

**SECTION C**

23., findand hence solve the system of equations **or**

Find the inverse of the matrix by using elementary row transformations

24.A window is in the form of a rectangle above which there is a semi-circle. If the

perimeter of the window is p cm, show that the window will allow the maximum

possible light only when the radius of the semicircle is  cm

25. Show that the volume of the greatest cylinder which can be inscribed in a cone of height h and semi vertical angle  is **or**

 An open box with a square base is to be made out of a given quantity of card board of area  square units . Show that the maximum volume o the box is 

26. Evaluate

**27.** Evaluate**** as limit of sum.

28.Find the area of the region 

29.Using the method of integration, find the area of the region bounded by the lines

2x + y = 4, 3x – 2y = 6 and x – 3y + 5 = 0.

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