

**SUMMER HOLIDAY HOME-WORK (Class XI)**

1. Use the properties of sets to prove that for all the sets A and B, A – (A  B) = A – B.

2. For all sets A, B and C, show that (A – B)  (C – B) = A – (B  C).

3. From 50 students taking examinations in Mathematics, Physics and Chemistry, each of the student has

 passed in at least one of the subject, 37 passed Mathematics, 24 Physics and 43 Chemistry. At most 19

 passed Mathematics and Physics, at most 29 Mathematics and Chemistry and at most 20 Physics and

 Chemistry. What is the largest possible number that could have passed all three examination?

4. Let U be the set of all boys and girls in a school, G be the set of all girls in the school, B be the set of all

 boys in the school, and S be the set of all students in the school who take swimming. Some, but not all,

 students in the school take swimming. Draw a Venn diagram showing one of the possible interrelationship

 among sets U, G, B and S.

5. Out of 100 students; 15 passed in English, 12 passed in Mathematics, 8 in Science, 6 in English and

 Mathematics, 7 in Mathematics and Science; 4 in English and Science; 4 in all the three. Find how many

 passed

 (i) in English and Mathematics but not in Science

 (ii) in Mathematics and Science but not in English

 (iii) in Mathematics only

 (iv) in more than one subject only

6.In a town of 10,000 families it was found that 40% families buy newspaper A, 20% families buy

 newspaper B, 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A

 and C. If 2% families buy all the three newspapers. Find

 (a) The number of families which buy newspaper A only.

 (b) The number of families which buy none of A, B and C.

7. If A = {2, 4, 6, 9} and B = {4, 6, 18, 27, 54}, *a*  A, *b*B, find the set of ordered pairs such that '*a*' is

 factor of '*b*' and *a* < *b*.

8. Find the domain and range of the relation R given by R = {(x, y) : y = x + ; where *x*, *y***N** and *x* < 6}.

9. If R 1 = {(*x*, ) | *x* is a real number} is a relation. Then find domain and range of R 1.

10. Find the domain for which the functions *f* (*x*) = 2*x2* – 1 and *g* (*x*) = 1 – 3*x* are equal.

11. Find the domain of the function *f* given by *f* (*x*) =.

12. Find the domain and range of the function *f* given by *f* (*x*) = 2 –.

13. A circular wire of radius 3 cm is cut and bent so as to lie along the circumference of a hoop whose radius

 is 48 cm. Find the angle in degrees which is subtended at the centre of hoop.

14. If α and β are the solutions of the equation *a* tan θ+ *b* sec θ = *c*, then show that tan (α + β) = .

15. Show that 2 sin2β + 4 cos (α + β) sin α sin β + cos 2(α + β) = cos 2α.

16. If angle θ is divided into two parts such that the tangent of one part is *k* times the tangent of other, and φ

 is their difference, then show that sinθ =  sinφ.

17. Solve cos θ + sin θ = .

18. Find the general solution of the equation 5cos2 θ+ 7sin2 θ – 6 = 0.

19. Prove that 22n– 1 is divisible by 3.

20. Prove that 2*n* + 1 < 2n, for all natural numbers n  3.

21. Prove by the Principle of Mathematical Induction that 1 × 1! + 2 × 2! + 3 × 3! + ... + *n* × *n*! = (*n* + 1)! – 1

 for all natural numbers *n*.

22. Prove by induction that for all natural number *n*

 sin α + sin (α + β) + sin (α + 2β)+ ... + sin (α + (n – 1) β) = .

23. Evaluate : (1 + *i*)6 + (1 – *i*)3.

24. Let *z*1 and z*2* be two complex numbers such that  +i  = 0 and arg (*z*1 z*2*) = . Then find arg (*z*1).

25. Find the value of 2*x*4 + 5*x*3 + 7*x*2– *x* + 41, when *x* = – 2 – i.