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Questions:

5 Marks

1. Prove that n (n+1) (n+5) is a multiple of 3, for all $n \in N$

2. Let A = {1, 2, {3, 4}, 5}. Which of the following statements are incorrect and why?
   (i) {3, 4} ⊂ A
   (ii) {3, 4} ∈ A
   (iii) {{3, 4}} ⊂ A
   (iv) 1 ∈ A
   (v) 1⊂ A
   (vi) {1, 2, 5} ⊂ A
   (vii) {1, 2, 5} ∈ A
   (viii) {1, 2, 3} ⊂ A
   (ix) ¢ ∈ A
   (x) ¢⊂ A
   (xi) {¢} ⊂ A.

3. Find the union of each of the following pairs of sets :
   (i) X = {1, 3, 5} Y = {1, 2, 3}
   (ii) A = [a, e, i, o, u} B = {a, b, c}
   (iii) A = {x : x is a natural number and multiple of 3} B = {x : x is a natural number less than 6}
   (iv) A = {x : x is a natural number and $1 < x \leq 6$ } B = {x : x is a natural number and 6 < x < 10 }
   (v) A = {1, 2, 3}, B = ϕ

3 Marks

4. Out of 100 students, 15 passed in English, 12 passed in Mathematics, 8 in Science, 4 in English and Science, 4 in all the three.Find how many students passed in Mathematics and Science but not in English?

5. If X={1,2,3} and n represents any member of X, write the following sets containing all numbers represented by $\frac{n}{2}$

6. Make correct statements by filling in the symbols ⊂ or ⊄ in the blank spaces :
   (i) { 2, 3, 4 } . . . { 1, 2, 3, 4,5 }
   (ii) { a, b, c } . . . { b, c, d }
   (iii) {x : x is a student of Class XI of your school}. . .{x : x student of your school}
   (iv) {x : x is a circle in the plane} . . .{x : x is a circle in the same plane with radius 1 unit}
   (v) {x : x is a triangle in a plane} . . . {x : x is a rectangle in the plane}
   (vi) {x : x is an equilateral triangle in a plane} . . . {x : x is a triangle in the same plane}
   (vii) {x : x is an even natural number} . . . {x : x is an integer}

7. Draw appropriate Venn diagram for the following:
   (i). (A ∪ B)′
   (ii). A′ ∩ B′
   (iii). (A ∩ B)′
   (iv). A′ ∪ B′

8. Using properties of sets, show that
   (i) A ∪ (A ∩ B) = A
   (ii) A ∩ (A ∪ B) = A.

2 Marks

9. Show that A ∩ B = A ∩ C need not imply B=C.

10. Let A and B be two sets such that n(A) = 18, n(A ∪ B) = 45 and n(A ∩ B) = 6. Find n(A-B)

11. Let V = { a, e, i, o, u } and B = { a, i, k, u}. Find V – B and B – V

12. If A and B are two sets such that A ⊂ B, then what is A ∪ B?

13. Let U be the set of all triangles in a plane. If A is the set of all triangles with at least one angle different from 60°, what is A'?