MTH_2215_Practice_Test_2

SPRING 2021

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Show CLEARLY how you arrive at your answers.

1. List the members of the set: $\{x|\ x \text{ is an integer such that } x^2 \leq 12\}$ in roster form:

2. Express the set $\{0, 2, 4, 6, 8, \ldots\}$ using "set builder notation."

3. Let $A = \{2, 3, 4\}$ and $B = \{2, 5\}$. Compute $A \times B$

4. Let $A = \{2, 3, 4\}$ and $B = \{2, 5\}$. Compute $B \times A$

5. Let $A = \{1, 2\}$; $B = \{a, b\}$ and $C = \{\alpha, \beta\}$. Compute $A \times B \times C$

For Exercises 6-9, Sets A, B, C, and U are defined as follows: $A = \{1, 2, 3, 4, 5, 6, 7\}$; $B = \{4, 5, 6, 7, 8, 9, 10\}$; $C = \{2, 4, 6, 8, 10\}$; $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

6. $A \cap B =$

7. $\overline{A} =$

8. $A \cup C =$

9. $B - C =$

10. For arbitrary sets A and B, give an equivalent expression for $\overline{(A \cup B)}$

11. For arbitrary sets A and B, give an equivalent expression for $\overline{(A \cap B)}$

12. Suppose that the Universal set is $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

    Express the set below with bit strings such that the i^{th} bit is 1 if i is in the set, and the i^{th} bit is 0 otherwise.

    (a) $\{2, 3, 5, 6\}$

    (b) $\{1, 3, 5, 9, 10\}$

13. Using the same universal set as in the last problem, find the set specified by each of these bit strings.

    (a) 1100101111

    (b) 0010100101

14. Compute the following values:

    (a) $\lfloor 2.3 \rfloor$

    (b) $\lfloor 2.9 \rfloor$

    (c) $\lfloor 3.0 \rfloor$

    (d) $\lfloor -3.5 \rfloor$

15. Compute the following values:

    (a) $\lceil 2.3 \rceil$

    (b) $\lceil 2.9 \rceil$

    (c) $\lceil 3.0 \rceil$

    (d) $\lfloor -3.5 \rfloor$

16. List the first three terms of the sequence whose n^{th} term is given by:

    (a) $a_n = 3n + 2$

    (b) $a_n = 2^n$

17. Given the expressions below, [1]write out the terms of the sums and [2]compute the value of the sums

    (a) $\sum_{i=1}^{3} (3i + 2) =$

    (b) $\sum_{i=1}^{3} \left(i^2 + 2i\right) =$

18. Compute the double sum: $\sum_{i=1}^{3} \sum_{j=1}^{2} (i + j) =$

19. Compute the value of the sum $\sum_{i=0}^{7} 3 \cdot 2^i$

20. Find the first six terms of the sequence defined by the recurrence relation: $a_n = -2a_{n-1}$; $a_0 = -1$