MTH 2215 Test 2
SPRING 2021

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Show CLEARLY how you arrive at your answers.

1. List the members of the set: $\{x|\ x$ is an integer such that $5 \leq x^2 \leq 50\}$ in roster form:

2. Express the set $\{0, 1, 4, 9, 16, 25, \ldots\}$ using "set builder notation."

3. Let $A = \{a, b, c\}$ and $B = \{1, 2\}$. Compute $A \times B$

For Exercises 4.a-4.d, Sets $A, B, C,$ and U are defined as follows: $A = \{2, 3, 4, 5\}$; $B = \{4, 5, 6, 7, 8\}$; $C = \{0, 3, 6, 9\}$; $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

4.

   (a) $A \cap B =$

   (b) $\overline{A} =$

   (c) $A \cup C =$

   (d) $B - C =$

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

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

7. 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 ith bit is 1 if i is in the set, and the ith bit is 0 otherwise.

   $\{2, 3, 5, 9, 10\}$

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

   0101101101

9. Compute the following values:

   (a) $\lfloor 2.7 \rfloor$

   (b) $\lfloor 5.9 \rfloor$

   (c) $\lfloor 6.0 \rfloor$

   (d) $\lfloor -1.5 \rfloor$

10. Compute the following values:

(a) $\lceil 8.3 \rceil$

(b) $\lceil 4.9 \rceil$

(c) $\lceil -6.01 \rceil$

(d) $\lceil -6.99 \rceil$

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

$a_n = 5n - 3$

12. Given the expression below, [1]write out the terms of the sum and [2]compute the value of the sum

$$\sum_{i=1}^{4} (5i + 2) =$$

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

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

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