Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

1) A subgroup H of G is normal in G if and only if \( xHx^{-1} \) is in H for all x in G.
   Consider the following statements on normal of the group.
   - S1: Every subgroup of Abelian group is normal.
   - S2: If H is the normal subgroup of G and K is any proper subgroup of G.
     Then HK = \{hk | h in H and k in K\} is normal of G.

   - S1 is true and S2 is false.
   - S1 is true and S2 is true.
   - S1 is false and S2 is true.
   - S1 is false and S2 is false.

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   S1 is true and S2 is false.

2) Which of the following maps is not a homomorphism?
   - \( f : (C^* \setminus \{0\}, \cdot) \rightarrow (R^* \setminus \{0\}, \cdot) \) where \( (\cdot = \cdot_{R}) \)
   - \( f : (M, \cdot \rightarrow (R^* \setminus \{0\}, \cdot) \) where M is the set of \( n \times n \) real-valued non-singular matrices \( A = \text{det}(A) \)
   - \( f : (C^* \setminus \{0\}, \cdot) \rightarrow (R^* \setminus \{0\}, \cdot) \) such that \( f(x) = 0 \) if x is even, \( f(1) = 1 \) if x is odd.

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   \( f : (C^* \setminus \{0\}, \cdot) \rightarrow (R^* \setminus \{0\}, \cdot) \), \( f(a \cdot ib) = \sqrt{a^2 + b^2} \)

3) Consider two cyclic groups of order m and n respectively. What is the necessary and sufficient condition for \( \mathbb{Z}_m \times \mathbb{Z}_n \) to be cyclic?
   - Either m and n must be a prime number.
   - Both m and n must be some prime power.
   - Both m and n must be relatively prime.
   - None of the above

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Both m and n must be relatively prime.

4) Suppose \( A = \mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2, B = \mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2, C = \mathbb{Z}_4 \times \mathbb{Z}_2, D = \mathbb{Z}_2 \times \mathbb{Z}_4 \). Which of them are isomorphic to each other?

   - Only A, D
   - Only C, D
   - Only B, C, D
   - All A, B, C, D

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Only C, D

5) Suppose a group contains an element a and b such that order of a is 4, the order of b is 2 and \( a^3b = ba \).
   Then what would be the order of ab
   - 5
   - 2
   - 3
   - 4

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
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