

SET Homework 3

Solve 6 from the 8 HW problems. Due time: Mar 3, Tuesday 8:15.

You can submit more than 6 solutions. The best 6 count.

You can get extra credit for the solutions of extra problems. You can submit the solutions of at most 2 extra problems weekly. Groups can submit joint solutions for shared credit. The extra problems do not have due time.

HW problems

Problem 2.17. Compute/simplify $\langle x, y \rangle \cap \langle y, x \rangle$.

Problem 3.3. Let E_0 and E_1 be equivalence relations on \mathbb{R} . Assume that both \mathbb{R}/E_0 and \mathbb{R}/E_1 are countable. Prove that $\mathbb{R}/(E_0 \cap E_1)$ is also countable.

Problem 6.17. Prove that $\bigcup_{n \in \omega} [2n, 2n + 1] \sim [0, 1]$.

Problem 6.18. Let C_1 and C_2 be disjoint circles. Show that $C_1 \sim C_1 \cup C_2$.

Problem 6.19. Let O_1 be an open disk and C_2 be a closed disk in the plane. Prove $O_1 \sim C_2$.

Problem 6.29. Let \mathcal{E} be the set of lines in \mathbb{R}^2 . Prove that $\mathcal{E} \sim \mathbb{R}$.

Problem 6.9. Let A, B, C and D be sets. Assume that $A \sim B$ and $C \sim D$. Prove that ${}^C A \sim {}^D B$.

Problem 6.30. Prove that any family of pairwise disjoint open intervals in \mathbb{R} is countable.

Extra HW problems

Problem 6.24. Prove that ${}^\omega 3 \sim {}^\omega 2$ without using the CBS theorem.

Problem 4.14. Are the ordered sets $\mathbb{Z} \times_\ell \mathbb{N}$ and $\mathbb{Z} \times_\ell \mathbb{Z}$ order isomorphic?