

MAT320 Quiz #5

10/3/2023

Please answer the following questions, and write your name on top of the quiz.

Question 1. Write the definition of a measurable set. Explain why, *using the definition*, if E_1 and E_2 are measurable, then

$$\mu^*(E_1 \cup E_2) + \mu^*(E_1 \cap E_2) = \mu^*(E_1) + \mu^*(E_2).$$

Question 2.

- a) Write down the axioms of a σ -algebra Σ on a set S .
- b) Give an example of a pair of σ -algebras Σ_1, Σ_2 on some set S such that $\Sigma_1 \cup \Sigma_2$ is not a σ -algebra on S . (It may help to play around with very simple examples for some finite sets S .)

Question 3. Write down any one of the equivalent forms of the axiom of choice.